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THE AUTOMOBILE

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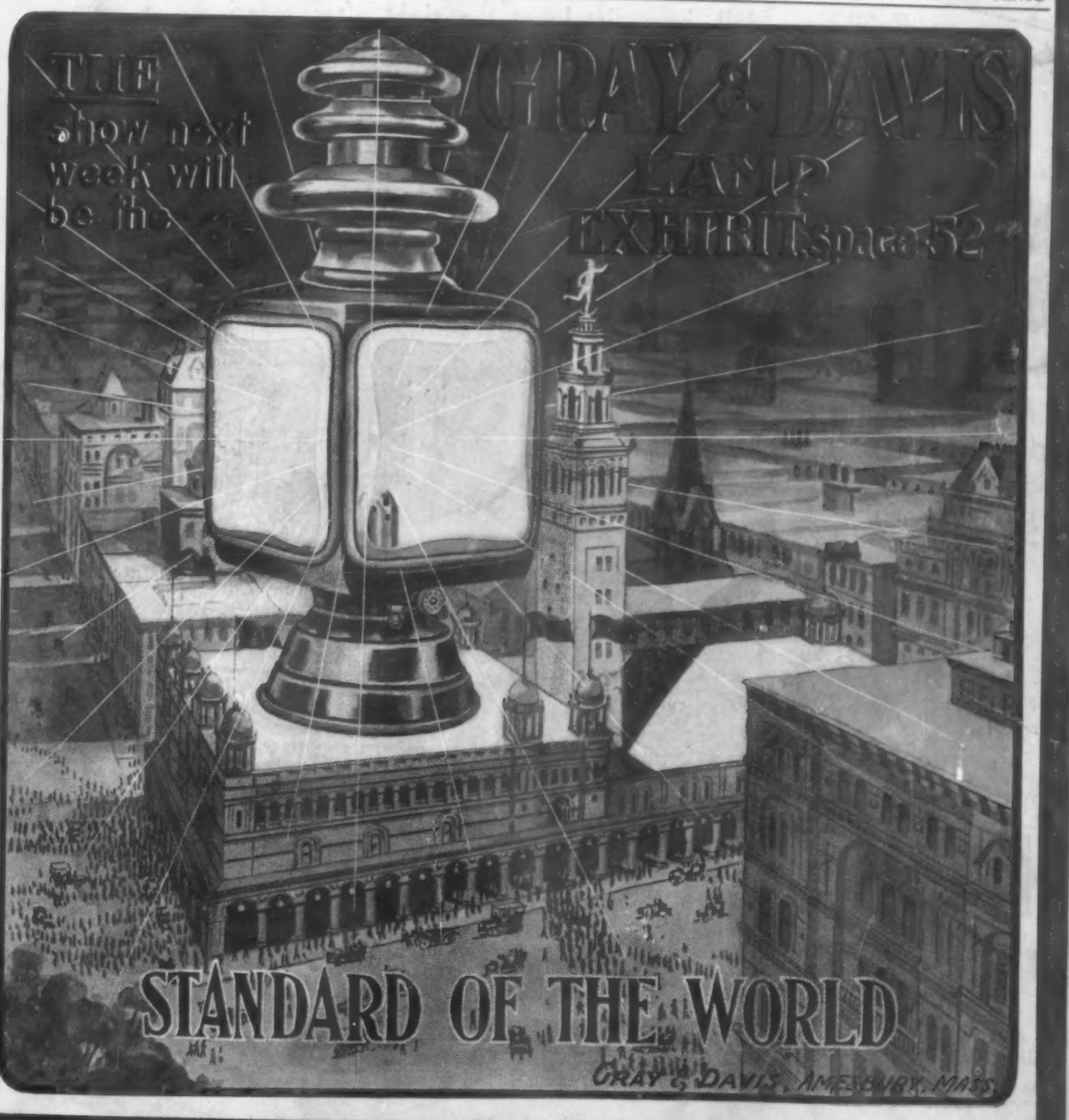

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CORBIN

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Be sure you see our exhibit at the Seventh National Automobile Show at Madison Square Garden, January 12th to 19th, 1907.

Owing to our late election to membership in the Association of Licensed Automobile Manufacturers, we are obliged to accept space in Exhibition Hall, immediately at the right after entering the main entrance to Madison Square Garden.

LOOK FOR OUR EXHIBIT THERE.

CORBIN MOTOR VEHICLE CORPORATION, New Britain, Conn.

Member Association Licensed Automobile Manufacturers.

NEW YORK BRANCH, 1779 BROADWAY

New England Agents:
E. T. KIMBALL COMPANY
Motor Mart, Boston

Middle West Agents:
BIRD-SYKES COMPANY
1470 Michigan Ave., Chicago

Our exhibit at the Chicago Coliseum will be in Space D-2, February 2-9, 1907.

Mora Tourer
TRADE MARK.

AGENTS

Mora Roadster
TRADE MARK.

WE can, at this time, undertake to supply a few more dealers in unoccupied territory; furnish demonstrating car promptly, and make some early deliveries.

Mora Roadster
TRADE MARK.

WRITE TO-DAY

Mora Motor Car Company

318 Livingston Building
ROCHESTER, N. Y.
Works at
NEWARK, N. Y.

Mora Tourer
TRADE MARK.

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THE AUTOMOBILE

VOL. XVI. NEW YORK—THURSDAY, JANUARY 3, 1907—CHICAGO NO. 1

PATHFINDER FORCING ITS WAY SOUTHWARD

ROADS that are such only in name will be the pathway of the Oldsmobile, that is persistently forcing its way southward, from now to the finish of its journey to the wind-swept Florida beach that connects fair Ormond with picturesque Daytona. Telegraph facilities in northwestern North Carolina may not be of the very best, but, barring mishaps, the Oldsmobile Pathfinder crossed the Virginia-North Carolina line on New Year's Day. The last information was from a little railroad junction a few miles north of the border, not far from Danville, Va., one of the largest towns in the Old Dominion, outside of Richmond. The message was confined to the five words: "Out all night. Heavy rain."

Contrary to precedent, however, the road for the greater part of the first end of the trip has been found to be uncommonly good for this season of the year. On the stretch from New York to Hagerstown, Md., but a few miles of poor road were encountered, though the going was more or less rough in places, owing to the freezing weather, as well as slippery occasionally from snow. This enabled a good pace to be maintained, an

CROSSING AN OLD-TIME BRIDGE OVER A HALF-FROZEN STREAM WEST OF HARRISBURG, PA.

PAYING THE PATHFINDER'S TOLL AT THE HARRISBURG BRIDGE OVER THE SUSQUEHANNA RIVER.

average of 110 miles a day having been made on this portion of the trip. The rolling character of the country, which is almost mountainous in parts, is one of the factors keeping down speed.

Progress Down the Valley of the Shenandoah.

The car left New York Sunday, December 23, the route lying through Philadelphia, Reading and Harrisburg, then by way of the battlefields of Gettysburg and Antietam, and down through the picturesque scenery of the Shenandoah Valley. The roads in the latter are good, and, although it is necessary to ford some of the streams, it is thought that this will become a favorite stamping ground for tourists, as soon as the necessary maps and information are published. Harrisonburg, Va., was reached on the 27th, after four days of steady driving, the trip of 109 miles from Hagerstown, Md., having been made through a severe storm of rain and hail. The total mileage to this point is 410, the tires still holding the air that was pumped into them at New York.

THE "YANKS" "CAPTURE" A CONFEDERATE CANNON ON THE BATTLEFIELD OF GETTYSBURG.

About forty miles outside of Hagerstown, a 25-foot creek had to be forded, and although the water reached within a few inches of the floor of the tonneau, the car went through without any trouble. The roads were so slippery that chains had to be used for sixty miles continuously.

Roanoke, Va., was reached Friday evening, after covering 120 miles of the worst roads encountered up to that time. Mountainous country, through which the roads were of heavy clay, made the going more or less difficult, though the scenery was the finest the party thus far had been treated to. Many points of interest were passed on the day's run, including the famous Natural Bridge. Upon leaving Roanoke, where a number of hours were lost owing to spring trouble, the party got its first taste of the battle that will have to be waged during the remainder of the journey. The roads were so muddy that it was difficult to average more than eight miles an hour, only 35 miles, most of which was done after dark, having been covered.

Struggling Through a Sea of Virginia Mud.

Saturday night found the party at Chatham, Va., which place was left behind early Sunday morning, and after struggling twelve miles through a sea of mud, Bedford Springs was reached, where the gasoline supply was replenished. From the latter point the same kind of going was encountered to Leesville, where it was found necessary to make repairs on an old barge before the car could be trusted to it, in order to ferry it across the Staunton river. On leaving the barge, the car mired on the river bank, and as it was already dark and raining heavily, the night was spent in it. In one place it was necessary to run for half a mile up the bed of a stream two feet deep, in order to reach the road again. Owing to the difficulties encountered, the mileage for two days and one night was only fifty-eight, bringing the total since leaving New York up to 612 miles.

R. H. Johnston, in a White steamer, was met near Harrisonburg, Va., which gave rise to the report that he also was making the trip to Florida. This was not the case, however, as Mr. Johnston was merely on a holiday trip, again starting northward after having met Mr. Owen and his party at the ford in the Shenandoah Valley stream, shown on opposite page.

MORE ABOUT FLORIDA TRIP.

By A. L. WESTGARD.

The article which appeared in THE AUTOMOBILE, November 15, and which gave a preliminary survey of an automobile route to Florida, has attracted considerable attention in the South. One native of Tennessee points out that the roads in the eastern part of his State are "certainly very bad" during a large portion of the year; and, besides, the lack of bridges would necessitate the fording of many streams, a task impossible except in dry weather. Yet it is reported that a party has set out from Minneapolis and intends to traverse eastern Tennessee.

It is also reported that a Boston man "has formulated a plan to establish a highway between the Hub and Atlanta, following the coast the greater part of the way south." While "following the coast" seems a little far-fetched, it has developed upon investigation among autoists who have been in the Carolinas and Georgia that a couple of feasible routes might be mapped out through the red sand country of these States, thus avoiding the route laid through eastern Tennessee.

One route could follow for the major part the one laid out to the Jamestown Exposition at Norfolk and which is being urged for next year's A. A. A. tour for the Glidden trophy. It would follow the Exposition Route's itinerary from New York through Philadelphia, Reading, Harrisburg, Gettysburg, Pa., Hagerstown, Md., and down the Shenandoah Valley to Staunton, Va., up to which point will be found pikes in fair conditions, with innumerable toll gates. Thence leaving the valley, it would cut across easterly over clayey, but on the whole not bad, roads to Richmond, or, if the weather was dry, take the much shorter way south from Philadelphia through Baltimore, Washington and Fredericksburg to Richmond. This route, covering roads not nearly as good as the longer one above, passes through a flat, uninteresting country. Continuing south from Richmond, it would pass through Petersburg—at which place it leaves the Exposition Route—Emporia, Va., Halifax, Wilson, Smithfield, Fayetteville and Pembroke, N. C., to Florence, S. C., thence through Sumter, Orangeburg and Bamberg, S. C., to Savannah, Ga., a distance of about 1,030 miles from New York.

WHERE JOHN BROWN WAS TRIED AT HARPER'S FERRY.

Another route could follow the Shenandoah Valley to Staunton and south to Lexington, Va., thence through Roanoke and Martinsville, Va., Winston-Salem, Mocksville and Charlotte, N. C., Chester, Winsboro and Columbia, S. C., Augusta and Waynesboro, Ga., to Savannnah, a distance of about 1,040 miles from New York. The territory from Augusta to Savannah is apt to prove itself full of difficulties. From Savannah to Jacksonville, Fla., about 140 miles, there are several stretches of fine

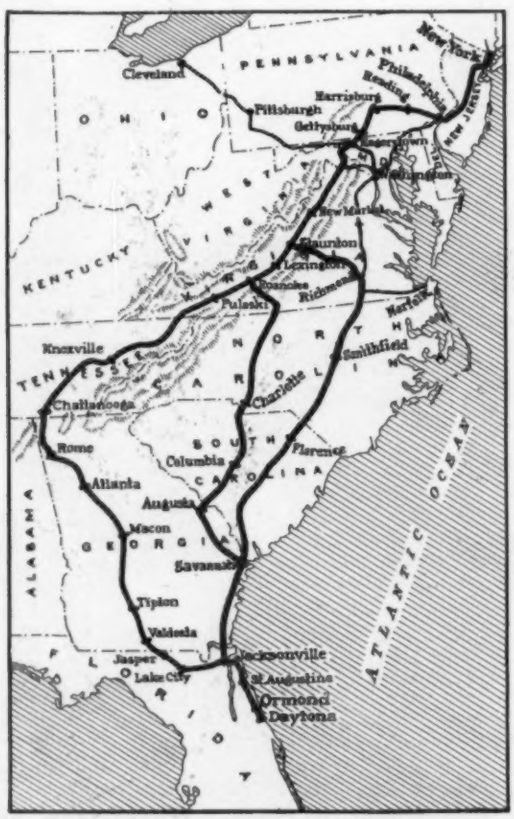
FOUR FEET DEEP FORD IN THE SHENANDOAH VALLEY NEAR HARRISONBURG, VA., WHERE THE OLDSMOBILE AND WHITE STEAMER EXCHANGED GREETINGS.

shell roads and the going ought to be comfortable. As pointed out in the former article, above mentioned, the road from Jacksonville south to Ormond and Daytona, via Pablo Beach and St. Augustine, though sandy and bad in places, has often been covered by automobiles.

The roads through the red sand districts of the Carolinas and Georgia are uniformly good in all kinds of weather, but both routes above given traverse great swampy areas where many detours will undoubtedly become necessary. It is well also to point out that hotels are far between and for long stretches entirely absent, a fact that to a great extent is offset by the generous hospitality of the natives. If one appreciates scenery and does not mind the hardships attendant upon the lack of hotel accommodations, one will certainly enjoy the run through the historic Virginia valley.

The Florida people have become thoroughly aroused to the importance of good roads, and it is intended to employ convict labor to build them, such means being already used in Dade county. The natives realize that since the ascendancy of the automobile, in order to bring a large number of people of means to the State to enjoy its climate—and incidentally to spend their money—they must make it attractive as viewed from the standpoint of an automobile tourist. To no other State in the Union do good roads mean so much as to Florida.

A good beginning has been made, as shown by the excellent clay and marl road just completed from Daytona through DeLand, Sanford and Orlando to Kissimee, a distance of 75 miles. A new road is also reported as being built from Orlando to Ocala, 65 miles. No doubt that the good work just started will continue and that in, let us hope, the reasonably near future, one will be able to enjoy many extended trips from the winter resorts of the charming State. It is up to the natives to provide the surface; the Northern tourist will do the rest.



THREE ROUTES THAT LEAD TO FLORIDA.

The Oldsmobile Pathfinder that is now en route, is taking the central route from Roanoke to Savannah.

A CORNER IN THE AERO CLUB EXHIBIT AT THE RECENT GRAND CENTRAL PALACE SHOW.

ST. LOUIS SELECTED AS STARTING PLACE.

St. Louis, Mo., January 1.—As the result of a trial ascension made from here to-day in the balloon *L'Orient*, which, after an uneventful trip of several hours, safely landed at Cliffdale, Ill., the special committee consisting of Courtland F. Bishop, Augustus Post, Alan R. Hawley, J. C. McCoy, Frank S. Lahm and Leo Stevens, who came here especially for the purpose of ascertaining if the gas supply were satisfactory for a large event, were unanimous in their selection of St. Louis as the starting point of next year's big balloon race, which is to be held in October.

The balloon was inflated at the yards of the Laclede Gas Light Company, at Second and Rutger streets, and a large crowd gathered to witness the ascension. When the guy ropes were released, the 35,000 foot gas bag rose gracefully in the air until it reached an altitude of about 1,000 feet, when it started to drift slowly toward the west. Alan R. Hawley and J. C. McCoy made the ascension, though they offered to step down in favor of David R. Francis and L. D. Dozier, president of the St. Louis Aero Club, who appeared just as the preparations were completed. The latter, however, declined the honor. When the aeronauts had not been heard from at 10 P.M. telegrams were sent to a number of surrounding towns, but nothing had been seen of the balloon. A wire was later received from Cliffdale, Ill., telling of the safe arrival at that point. The highest altitude reached was 2,100 feet, the earth being invisible most of the time owing to the clouds.

So pleased was the committee with the conditions that it was decided not to visit other cities. The Common Council has set aside a plot of ground adjoining the gas works for the use of the aeronauts. The choice of St. Louis is particularly appropriate, as it was from that city that the start was made nearly half a century ago, resulting in the world's long-distance record that stood until beaten by Count de la Vaux six years ago.

FIRST CONTEST FOR LAHM CUP.

In order to foster interest in aeronautical matters, as well as to commemorate the victory of Lieut. Frank P. Lahm, U. S. N., over foreign aeronauts in the race for the International Cup, the Aero Club of America has decided to offer a trophy for aeronautic races in the United States, the first of which is to be held in connection with the Jamestown Exposition next year. The conditions provide that the first winner of the cup must exceed Lieut. Lahm's record of 402 miles, and each succeeding winner must succeed the record of the previous holder in order to gain it. The Exposition was selected for the first contest, as the Aero Club intends to hold an aeronautic congress in connection with it, at which many of the machines shown will be tested by the government.

IN THE PINES OF NEW JERSEY.

LAKEWOOD, N. J., Jan. 1.—Only 72 miles separates the metropolitan autoist from the heart of the Jersey pine country where automobiling at this time of year is a most pleasurable and exhilarating pastime. In order to appreciate the climatic difference to be obtained by the comfortable run of several hours from New York City one should leave Manhattan Borough in disagreeable weather and note the gradual change as he progresses towards Lakewood. It is only eight miles from New York City to Newark, and thence the route—fully described in "THE AUTOMOBILE Official A. A. A. Blue Book"— is through Elizabeth, Rahway, Metuchen, New Brunswick, Old Bridge, Bloomfield, Spotswood, Helmetta, Jamesburg, Englishtown, passing the Monmouth battleground, thence to Freehold with its military academy, next through Turkey, Ardena, Farmingdale, Lower

A MAXWELL PARTY IN THE PINES NEAR LAKEWOOD.

Squankum, and in a direct line to Lakewood. The road is generally good and sometimes really excellent. Lakewood being the most fashionable of the Northern winter resorts, possesses several magnificent hotels and also Georgian Court, the palatial residence of George Gould, who has constructed a country place costing several millions. John Rockefeller is another frequent Lakewood resident and his golf proclivities make him a familiar figure. The name of Mr. Rockefeller was last week added to the list of notable men who have taken out automobile licenses in the State of New Jersey.

One can return from Lakewood by going to Point Pleasant over one of the best eight-mile stretches of road in New Jersey, thence taking the Ocean Road as far as Seabright, and thence traversing the famous Rumsen Road to Redbank, and go through Middletown, Keyport, Mattewan and Frenault, reaching Old Bridge, whence the down route would be duplicated.

Though there has been considerable criticism of the present New Jersey automobile law, it is anticipated that the coming

CROSSING THE BRIDGE OVER GEORGIAN COURT.

Legislature will make some needy changes that will disarm much of the criticism met with since the Frelinghuysen measure went into effect. New Jersey has the roads and New Jersey intends to build more of the same kind, and if necessary use a different form of construction for the use of the automobile, which even country folk are beginning to realize has come to stay and will be a blessing and convenience to mankind in general.

ALCOHOL TEST PROVED AN EVENTFUL TRIP.

PHILADELPHIA, Jan. 1.—Owing to a delay occasioned almost at the very outset of the trip, by breaking the front axle and a spring through a loose plank wedging in the running gear midway between Jersey City and Newark, Joe Tracy and the Dragon did not reach Philadelphia on the alcohol test run until late last night. The accident occurred at 1:15 A.M., and was due to the fog and rain. A loose section of the plank road sent the car flying into the air, and had Tracy not been proceeding cautiously the mishap might have been serious. Repairs were not effected until Rahway was reached, the road having been lost twice in the meantime. Thirteen gallons of denatured alcohol were consumed on the run of more than 100 miles. Under the old law this would have cost $35.10, or less the tax $7.15. About six gallons of gasoline would have been required for the run at a cost of $1.20.

FAST AUTOS FOR FLORIDA MEET.

H. N. Harding has been selected to drive the new 110-horsepower Oldsmobile in the coming Ormond-Daytona meet. Since the death of Ernest Keeler, at Point Breeze track, Philadelphia, the Oldsmobile people have been looking for a good driver, and Harding's selection probably means he will do all their driving in 1907. Walter Christie is working on a new racer for the Florida meet and hopes to have same in readiness for that event. Two Wayne machines, a 35-horsepower and a 50-horsepower, have been entered by A. L. Kull, New York agent. Arthur Duray, the noted French driver, will compete with his 130-180-horsepower De Dietrich.

THE LAKE IS A SCENE OF GREAT ACTIVITY IN WINTER.

FLOOR PLANS OF THE COMING GARDEN SHOW

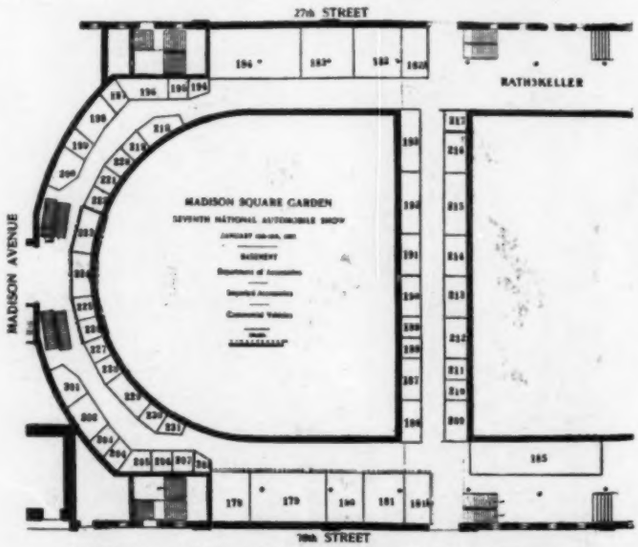
SUPPLEMENTING the alphabetical list of exhibitors and the numbers of the spaces that they will occupy when holding forth at the Seventh National Automobile Show, which will occupy the Garden during the week of the 12-19 of the present month, which was published in THE AUTOMOBILE last week, diagrams of the various floors showing the exact locations of the various spaces as well as the grouping of the exhibits into classes are shown. Time-honored arrangements that have prevailed in the past hold good and the imported cars will, as usual, be centered in the restaurant at the right of the main entrance. Commercial vehicles will occupy the basement and sundries and accessories will be found along the balconies and galleries, except that the visitor will have to mount further heavenward this year than ever before, in order to arrive at the level of the first accessory exhibits, for, as announced some time ago, the pressing demand for space in which to exhibit cars has been met in a measure by building an extended platform over the tier of boxes. This will be devoted entirely to showing cars, which will naturally be of the lighter weight touring car and runabout types.

"PROSPERITY."
A Garden Show Statue.

What the Show Will Reveal.

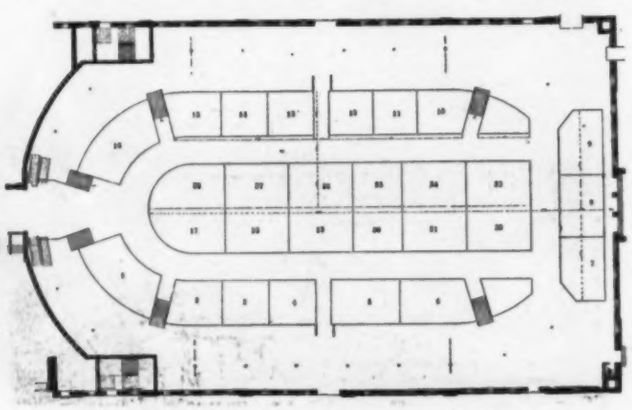
Although a number of the 1907 models were not only completed some time ago, but have been sold to purchasers and are running on the roads, it is a matter of common knowledge that a majority of the makers have something or other "up their sleeves" which will not be uncovered until the cars are staged at the show. And though it is well understood that little of radical design is to be looked for, there has been more or less secretiveness regarding just what form the novelties will appear in. Many new things in the shape of detailed changes and improvements in many parts of the car are promised, and while the latter must of necessity be confined to things that make no perceptible difference in the machine in the great majority of instances, those who go looking for novelty will be able to find plenty of it.

There is little doubt but that the conbination gasoline-electric chassis of the Electric Vehicle Company will prove the drawing card of the show, while under the head of attractions, the official press agent mentions a "waterless" fire engine—in other words, a motor fire engine with an air-cooled motor. No new adherents to the six-cylinder principle have made themselves known since last year, so that there will be the same number of multi-cylindered cars of this type in evidence as previously, except that there will be shown a six-cylinder car that has but three cylinders—a two-cycle motor, which is put forth as a substitute for six cylinders of the four-cycle type. The makers of the Pope-Toledo represent one of the few instances in which standards of design have been totally abandoned, their motor having undergone a complete process of revolutionizing during the past year. In accordance with the latest practice it will have both valves in the head, and though the opposite disposition has been retained, but a single camshaft is employed, working through a walking beam type of valve-operating gear. Motor design, where valve placing and operation are concerned, is something that has come in for considerable attention and it is anticipated that its influence will be in evidence on other motors.

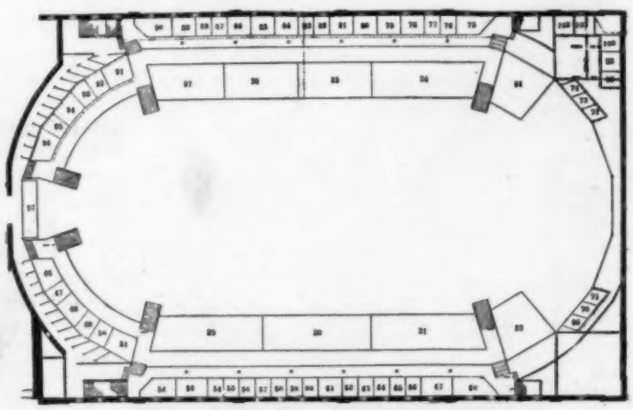


WHERE THE COMMERCIAL VEHICLES WILL BE SHOWN.

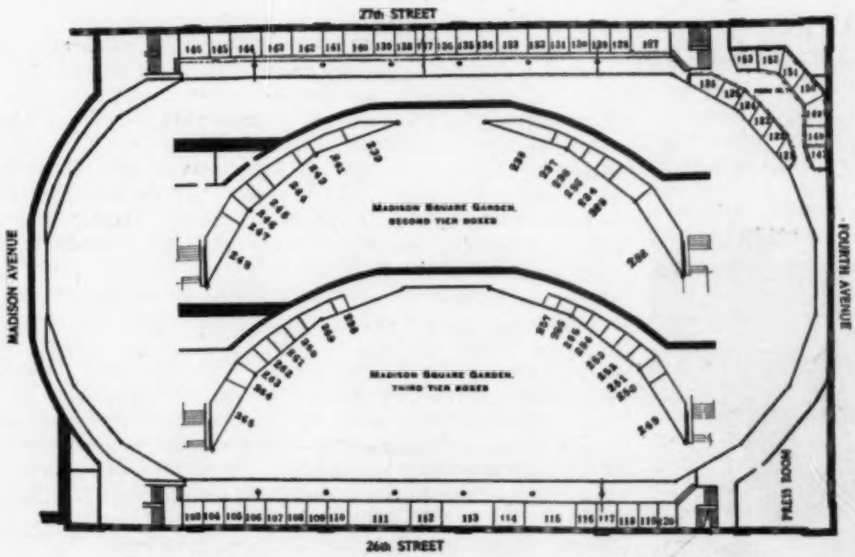
The question of offsetting the cylinders on the crankcase in order to reduce the pressure and consequent friction on the power stroke of the motor is another matter that has received no little attention. The Winton motor represents one of the most prominent adherents to this standard and doubtless others may be



HOW THE MAIN FLOOR WILL BE APPORTIONED.



ELEVATED PLATFORM AND MEZZANINE FLOOR



ALLOTMENTS FOR THE GALLERY; ALSO SECOND AND THIRD TIER BOXES.

looked for. As usual, changes and improvements will be confined for the most part to matters of detail and it is said that more or less novelty is to be looked for in carbureters.

SPACE ALL SOLD FOR THE BOSTON SHOW.

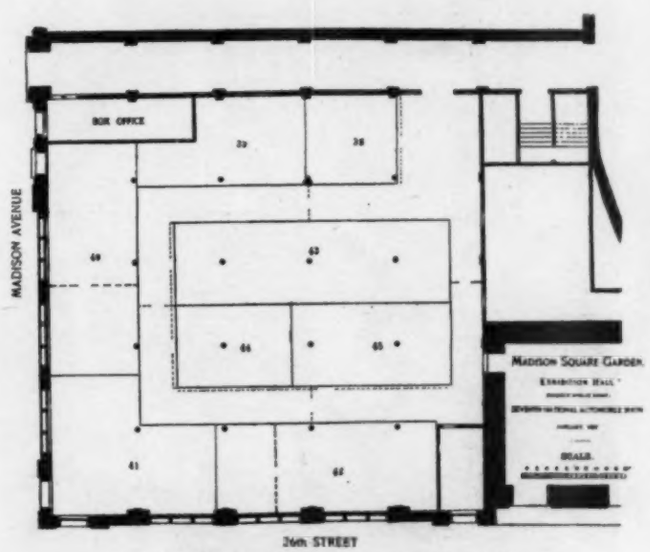
BOSTON, Dec. 31.—Though the Boston show is two months and a half away, the old cry has arisen that the space is all gone, and the manager and show committee of the Boston Automobile Dealers' Association are having difficulty in finding places for all the applicants for space. In Mechanics building and Horticultural hall, which are engaged for the show, the committee had available 105,000 square feet of space. This has been allotted, and if many more applications are received the committee will be forced to take another building. Such a building is available in a new garage that is being erected near Mechanics building, and if this is leased the committee will have 30,000 additional feet of space. At the present time the side walls of the corridors in Mechanics building are being sold to accessories manufacturers who could not secure floor space. Manager Chester I. Campbell has not yet announced the decorative scheme for this year's show, but he promises that it will be more elaborate and complete than ever before. He is to make a trip next week, during which he probably will close the contracts for the decorations. The show promises to be more complete than its predecessors in every department. There will be not only a greater number of cars, but a larger number of exhibitors of accessories, and the power boat department in the basement will include a larger number of boats than it has in previous years. The commercial vehicle department is also to be larger and more comprehensive.

A VETERAN'S VIEWS.

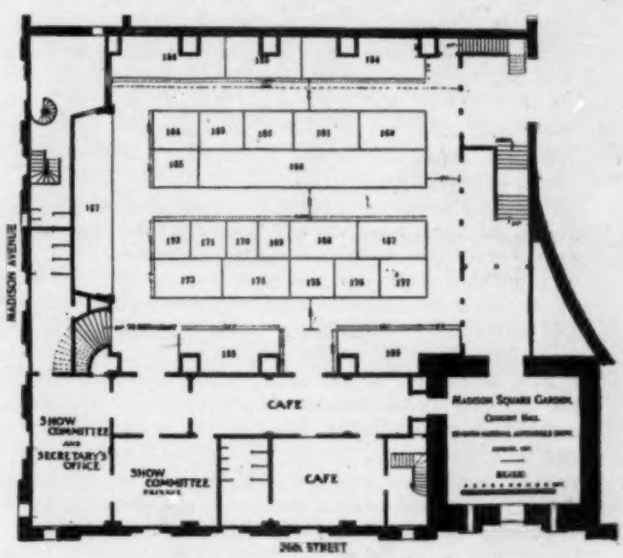
Col. George Pope, who was "among those present" at the beginning of the bicycle manufacturing industry and again when automobiles were first made, says, among other things: "In years gone by, when the old guard makers were new in the field and were looking for dealers to handle their product, the national show was largely a trade event, to which the manufacturers went seeking to do business with retailers. Now the old established manufacturers all have their regular line of dealers and the orders from these are booked in the fall. They do not go to the show to engage dealers to handle their output, because they are already supplied in this respect. They go to display the new models to the public, and the show, from being a purely trade event, has become a sort of festival for society and the automobiling class."

PHILADELPHIA'S SHOW OPENS JANUARY 5.

PHILADELPHIA, Jan. 1.—With a score of applicants for space entirely unprovided for, and with the half-hundred or more lucky ones who were able to crowd in inadequately provided for, the annual show of the Philadelphia Automobile Trade Association opens in the First Regiment Armory next Saturday evening, January 5. Despite this fact, the show promises to be the most successful ever held in the Quaker City.



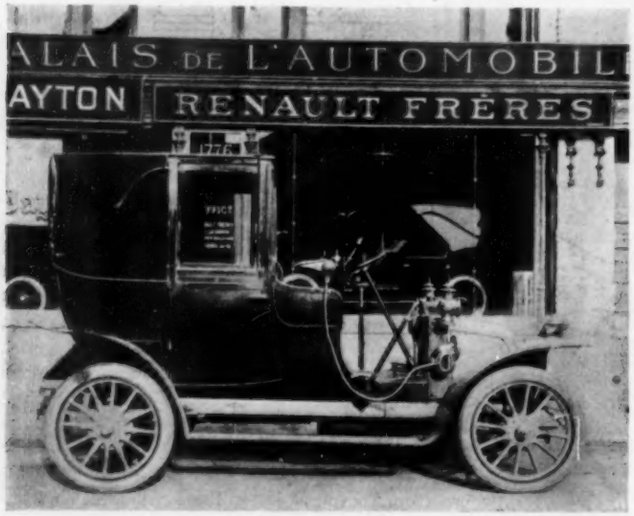
EXHIBITION HALL SPACES ON MAIN FLOOR.



CONCERT HALL AND ITS APPORTIONMENT.

AUTO CABS IN PARIS.

PARIS, Dec. 20.—It was not until this year that automobiles for the people came into general use in Paris. For a long time there had been a miscellaneous collection of vehicles around the Opera House in which, for as high a price as the driver could obtain, you might have a run around town or make a journey to the seaside—if the motor was capable of it.



FIRST OF THE RENAULT CABS TO REACH NEW YORK.

Paul Lacroix, manager of the Renault Frères Selling Branch, states that arrangements have been practically completed for the formation of an American company which expects to have Renault cabs running in New York City before the end of the year. The cab above pictured is the first one to reach this country, and it has attracted much attention in the Metropolis.

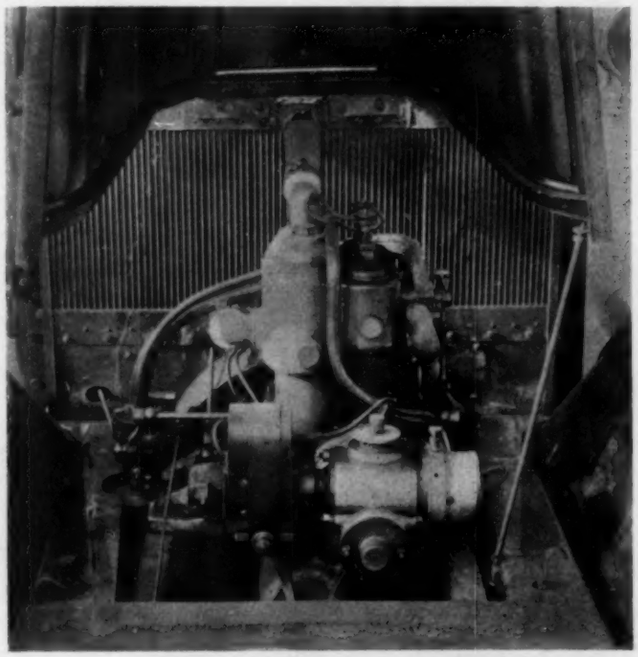
At the end of 1905 a company placed on the streets a number of taximeter cabs, the chassis of which were specially designed and built for town service by Renault Frères. From the first day the venture was a success. No sooner were the 250 Renaults in circulation and doing good business than other firms undertook the construction of machines for this work. At the present moment Bayard-Clément has 200 cabs on order, ten of which are at present on the road. The Darracq factory is building 1,100 chassis for cab work, 800 of which will go to London and 300 remain in Paris. Panhard has a small number in circulation and is building more. Other firms at present building or having finished cabs for Paris are Chenard & Walcker, Georges Richard, maker of the "Unic," Mendelssohn and Tony-Huber. At present the number of cabs in use is about 400, Renaults largely predominating. At the end of 1907 at least 1,500 automobile cabs will be in circulation in Paris.

The rate in Paris is 15 cents for a distance of 984 yards, every additional 328 yards being charged two cents. At night and for journeys outside the city there is a slightly increased tariff. The drivers, many of whom are men previously in charge of horse cabs, are paid a percentage on their takings: 15 per cent. on the part of their earnings below $6; 20 per cent. on the part of their earnings from $6 to $8; 25 per cent. on the part of their earnings from $8 to $10; 30 per cent. on the earnings above $10. Taking $9 a day as his average receipts, the driver gains $1.65 a day, to which must be added his tips and a slight percentage earned on gasoline. Each driver buys his own gasoline and is allowed by the company 15 per cent. of his total earnings for this purpose. Generally the driver obtains a slight advantage by this arrangement, the tariff being calculated on average running.

The driver's wages and gasoline paid, an average of 30 fr. 50c. per day and per car remains for the company. Ten centimes (two cents) per kilometer is calculated as the average tire expense, and as each cab runs 130 kilometers a day, 13 francs have to be deducted, leaving 16 fr. 50c. per car. Depreciation is worked out on a three years' basis, with 300 running days in a year. The price of a cab being 7,500 francs ($1,500), the amount to be written off is 8 francs per day, bringing the profit down to 8 fr. 50 c. Garage charges, accessories, insurance, etc., take away 3 fr. 50 c., leaving a net profit of 5 francs ($1) per cab per day.

The Renault chassis supplied to the cab company are in their main lines similar to the firm's standard models, with simplifications rendered necessary by the arduous service they have to undergo. The length of the chassis is 137 inches; wheelbase 100 inches; length for bodywork from dashboard to rear, 96 inches. The track is 51 inches, and the width of chassis 31 inches. Pressed steel frame of the usual channel section, supported on four longitudinal semielliptic springs and one transverse rear spring. The engine, which is carried forward, under the familiar type of Renault bonnet, with dashboard forming radiator, consists of one pair of cylinders 2.95 inches bore and 4.7 inches stroke, rated at 8 horsepower. The most important modification of the ordinary model is the total absence of controlling levers on the steering wheel. There are two foot pedals, the left-hand one operating the clutch and brake on the differential and the right-hand one the accelerator. On the dashboard is a small regulator controlling both the gas and spark, and by means of which exceedingly slow speeds can be obtained. Three forward speeds and reverse of the selective sliding type operated from a single lever, give 5, 9 and 21 1-2 miles an hour. Transmission is of the usual Renault pattern by cardan shaft to rear live axle. Five and three-quarter gallons of gasoline are carried in tanks under the driver's seat, this supply being more than sufficient for a day's work. Gasoline is supplied to the carbureter by gravity feed, and the water circulation is by thermo-syphon. Every effort has been made to produce the simplest possible design, and in this the manufacturers have admirably succeeded. Slight repairs, such as the changing of a tire, ignition troubles, and the like, are attended to by the mechanic himself.

Though elegant in design, the bodywork of the automobile cabs is exceedingly simple. It is constructed by the Company Rhéda, of Levallois, near Paris, and consists of landaulet with folding seat, the rear seat accommodating three and the folding seat two persons. In one minute the top and sides can be folded down, making an open carriage with glass screen between driver and passengers. All the glass windows can be lowered into pockets.



TWO-CYLINDER RENAULT ENGINE OF 8-HORSEPOWER.

FRENCH GRAND PRIX NOT YET SELECTED

PARIS, Dec. 20.—A circuit has not yet been discovered for the Grand Prix of the Automobile Club of France, to be run between June 25 and July 8. Neither of the two circuits in the Fontainebleau has been found suitable for the race owing to narrowness at certain points. A short circuit has been definitely decided upon, but its width must never fall below 22 feet. Several portions of the proposed Fontainebreau circuit only give 20 feet in width without any possibility of widening.

Why One Newspaper Opposes Racing.

The anti-racing campaign has again broken out in a certain section of the French press. *Le Matin*, a daily newspaper of considerable political importance, re-opened the attack yesterday by a violent attack on racing in general and the Grand Prix of the A. C. F. in particular, and terminated by declaring that the Government would not accord the necessary permission for the holding of the race next year. Replies from racing partisans have come forth with promptitude, several journals hinting that *Le Matin's* antipathy to racing only took form when the principal French firm refused to take part in that paper's self-advertising touring contest. A revelation of the personal motives animating the militant non-racers is promised and the squabble may become bitter.

The declaration that the Government will not accord permission for the holding of the race is more of a desire than a reality. No such opinion can have been expressed by any official, for the simple reason that the A. C. F. has not yet given notice of its desire to hold a race. During his visit to the Salon, M. Clemenceau, president of the Council, discussed the question of the Grand Prix with the heads of several important firms, and showed himself very liberally disposed. In due time the A. C. F. will ask for official permission to hold its race and there is every probability that it will be accorded without serious objection.

Hemery No Longer a Darracq Driver.

Hemery, the 1905 winner of the Vanderbilt Cup, has left the Darracq firm and signed an engagement to drive in speed contests for Tourand & Cie., of Suresnes. Since his last visit to America the dare-devil Darracq driver has not had much success in speed contests, and when a conductor had to be chosen for the 1906 Vanderbilt race, Hemery was sidetracked in favor of his companion, Wagner, who had run up a better speed record during the preceding six months. It is said this setback decided Hemery to quit the firm for which he had won so much glory.

THE RACE FOR THE EMPEROR'S CUP.

BERLIN, Dec. 20.—The Taunus Cup race will take place on June 14, when it is hoped that at least sixty cars will assemble. France and Italy have promised numerous entries. December 31 the lists will be closed. There has been some grumbling about the short period between the issue of regulations and the closing of the entries, but this will give the firms more time to prepare. Up to date of writing Germany is represented by Horch, Opel and Benz, each with a full team of three cars.

Italy is very much in sympathy with the event and has adopted the weight and cylinder capacity limits for the Florio Cup, at the same time stating that the Italian A. C. will not be officially represented in the French Grand Prix. This is quite a feather in Germany's cap.

NOT MUCH DONE AT INTERNATIONAL CLUB CONGRESS

PARIS, Dec. 20.—There was little business of importance at the International Congress of Automobile Clubs, held at the Automobile Club of France this week. Delegates attended from every European country, and America was represented by J. Howard Johnston and William S. Hogan.

In view of the efforts made by the Automobile Club of Switzerland to abolish the numerous petty tyrannies to which autoists have been subjected in that country, it was decided to suspend the boycotting carried on for the past year. In future complaints will be made to the Automobile Club of Switzerland and that body will make inquiries and do everything possible to safeguard the rights of automobile tourists.

In view of difficulties arising from the diversity of regulations for speed contests—the Grand Prix, the German Emperor's Cup, and the Brescia circuit all being run on totally different lines—the German club proposed a unification of regulations. For 1907 this is impossible, but a new formula will be drawn up and presented at the next congress, to be held on June 15 at Hamburg, on the occasion of the race for the German Emperor's Cup. At the same meeting the question of dates of the different automobile exhibitions will be discussed with a view to obviate clashing of interests. In future the members of the congress will meet twice a year, in December at the A. C. F., and in some other country during the summer.

Dates Decided Upon for European Events by the International Congress.

Feb. 16.....—Turin Exhibition.
Feb. 23-26.....—A. C. Italy, Voiturette Contest.
March 20-27.....—A. C. Nice, Automobile Week.
April 2-15.....—Monaco Meeting (Autoboats).
April 1-15.....—Spring Wheel Competition.
April 15-30.....—Nautical Club of Nice (Auto and Sailing Boats).
April 18-20.....—Targa Florio.
April 25-28.....—A. C. of Touraine, Touring Competition.
April 28.....—Château-Thièrry Hill Climb.
May 1-15.....—Paris-Madrid Touring Competition and Madrid Automobile Exhibition.
May 24-27.....—A. C. of Austria, Voiturette Contest.
May 15-31.....—A. C. of Siene and Oise, Wheel Competition.
May 15-31.....—A. C. of the North, Industrial Vehicle Competition.
May 31.....—A. C. of Auvergne, Rochet Schneider Cup.
June 1-4.....—A. C. of Bordeaux, Autoboat Meeting.
June 3-12.....—Herkomer Cup.
June 3-12.....—Electric Vehicle Competition (Paris).
June 14.....—German Emperor's Cup (Taunus Circuit).
June 15-28.....—Kiel Autoboat Exhibition and Races.
June 25-July 8.—Grand Prix of A. C. F. (Exact date has yet to be decided upon.)
July 7-10.....—A. C. of Bordeaux, Touring Competition.
July 15-18.....—Ostend Week.
July 19-22.....—A. C. of the North, Baron de Caters' Cup and Leopold Cup.
July 25-30.....—Belgium Criterium.
August 2-13....—Auvergne Cup.
August 14.....—A. C. of Austria (Autoboats).
August 18-22...—Ardennes Circuit and Coupe de Liedekerke.
August 23-26...—Ostend Week (Autoboats and Cars).
Sept. 1.....—Florio Cup on Brescia Circuit.
Aug. 30-Sept. 3.—Evian Autoboat Meeting.
Sept. 5-15.....—Arcachon Autoboat Week.
Sept. 12.....—A. C. of Salon, Speed Contests.
Sept. 14-15.....—Mont Ventoux Hill Climb.
Sept. 15.....—Semmering Hill Climb.
Oct. 6.....—Autoboats at Maisons Laffitte.
Oct. 13.....—Dourdan Kilometer Speed Tests.
Oct. 20.....—Gaillon Hill Climb.
Nov. 1-15.....—Voiturette Contest near Paris.

REMEDIES FOR ROADSIDE PERPLEXITIES

By THE MAN AT THE WHEEL.

IT is well for the autoist who takes pleasure in grooming his own car, and prides himself on being equal to every emergency, to realize that every case of missed explosions in the motor is not due to either ignition or carbureter trouble. The chances are many to one that one or the other of these is at fault; however, as it has been figured that of the total number of stoppages to which a motor is subject, the ignition is responsible for something like 50 per cent. and the carburetion, in which is included other essentials of the fuel supply than the carbureter itself, 40 per cent. on the average, leaving but 10 per cent. to be accounted for by all other troubles of whatever nature. And one of these other troubles that will produce symptoms so nearly akin to those indicating ignition or carbureter ills as to invariably lead the search in their direction can frequently be traced to a leaking inlet valve. No better illustration of this can be cited than the case of a high-powered car which persistently missed despite every effort to locate trouble in the ignition system or the carbureter. Every test proved them to be working at their best, so the valves were finally removed, and it was found that the inlet valve of cylinder number three had quite a piece chipped out of its edge, causing it to leak badly. This permitted the gas under compression to be forced back through the manifold and out through the main air intake of the carbureter. Consequently cylinder number two, which was next in order to fire, did not receive any charge and missed fire. At times number three would force most of the charge out through the hole in the valve so that it would also miss, causing the latter to apparently jump to different parts of the engine in an extremely puzzling manner.

One of the Causes of Lost Power.

Few things are more puzzling to figure out for the driver whose experience does not date back very far than a motor that will run perfectly at low speeds, but which begins to spit, misfire and choke the moment an attempt is made to accelerate it. The symptoms are indicative of carbureter trouble, and anyone who recalls his experience with the old time non-compensating carbureters, in which it was necessary to alter the amount of air given for every change of motor speed, does not have to puzzle very long as to the cause. On the other hand, a driver whose experience has been entirely with the present-day automatic carbureters, in which adjustment is practically confined to giving the needle valve a turn one way or the other in order to alter the amount of fuel entering the nozzle, does not find the problem so easy of solution. Traveling along a country road not long ago the writer came across a driver who found himself in this situation. He had been going along smoothly at a good pace, up hill and down dale, when suddenly the motor seemed to go into a tantrum. It sputtered, popped and "laid down." The first twist at the crank set it running again as smoothly as ever, and the driver resumed his seat preparatory to getting under way, feeling much relieved that things were not half as bad as the symptoms seemed to promise. But he was doomed to disappointment, for the moment he tried to speed up the engine and let in the clutch the same performance was repeated, and the engine stalled. He had been going through this process for half an hour or more when we came along, and the impatience of the people he was driving had about reached a point where they were tempted to walk to the nearest railroad station and continue their journey that way. The helpless, exasperated look of the chauffeur would have been enough to melt the heart of the autoist least inclined to render assistance had the passengers not actually signaled us to stop. Of course, they were of the opinion that the case was utterly hopeless and merely wished the favor of a lift to the station, while the chauffeur thought of nothing but a tow. Before we did either an investigation was undertaken, and the motor having duly displayed its symptoms at the beck of the chauffeur for our benefit, the carbureter was tackled. The trouble was apparent even without dismounting it. A spring controlled plate closed the opening of the auxiliary air inlet, and, under ordinary conditions, its adjustment should have been such as to cause it to yield to the slightest touch of the finger; but, as it was, poking it with a pencil end failed to disturb it. It had jammed tightly on its seat, with the result that when the motor speeded up the mixture became so rich that the engine could not possibly run on it. An unusual bump had unseated the spring and caused it to bind against the side wall of the intake, and as soon as this was set right there was no further trouble with it.

Poor Adjustment Weakens the Motor.

It is one of the peculiarities of the automobile motor that it will very frequently run perfectly, or apparently so, at a low speed, sometimes even carrying the load well on low gear, and all but refusing to perform when a higher speed is attempted or the direct drive is employed. Next to having the engine in perfect running order, while a break in some one of the links of the transmission prevents progress, there are few things more exasperating than being compelled to crawl along at six or eight miles an hour on the low gear with the engine running as if it would shake itself off the car. Such a state of affairs is usually considered to be indicative of about as small an amount of skill in driving as a man can possibly possess and still manage to run a car. In the great majority of cases it can be traced to the coil vibrators and the sluggishness of the latter can, in turn, be laid to the battery in many instances. It is safe to say that in nine cases out of ten the coil vibrators are adjusted so as to take anywhere from one to three times as much current as is actually needed to run the engine up to its maximum. In other words, two-thirds of the current is usually wasted, and still many autoists condemn their batteries because the mileage obtainable from a charge is so small. As soon as the battery falls off a bit there is not sufficient current to start the vibrator working as quickly as it should, and in consequence the coil works sluggishly. It lags, and no matter how far the time of ignition is advanced, the charge is, in reality, not being fired until much later in the stroke, which readily accounts for the loss of power. With a motor turning over at the rate of 1,000 r. p. m., but .03 of a second are required to complete the power stroke in each cylinder so that the time element becomes of extreme importance. It is easy to realize that no matter how small a fraction of a second the vibrator lags behind the moment of contact at the timer, this is bound to exert considerable influence on the time that the explosion occurs in the cylinder. The vibrators should always be adjusted with the engine running, and, if possible, with the aid of a low-reading ammeter; that is, one on which the dial is calibrated into easily readable fractions of an ampere. The fluctuations of current are so violent, however, that an accurate reading will only be possible by holding the vibrator down momentarily. This will give a higher reading than the amount of current actually used, but will be valuable as a comparison.

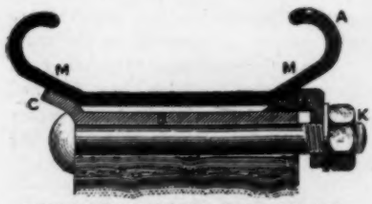
Some Things Worth Remembering.

A sudden and complete stopping of the motor points a break in the ignition system almost invariably; gradual slowing down and weakening of the motor may be due to either the ignition or failure of the fuel supply, while spasmodic running is most often caused by the former. These and a few other fundamental principles of like nature if constantly borne in mind will frequently be the cause of being able to put your hand right on the trouble.

TIRES, PATENT RIMS, AND WHEELS AT THE SALON

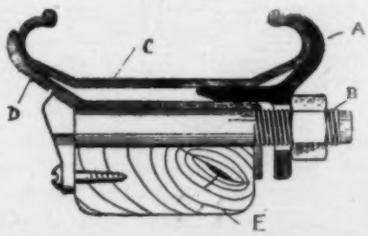
By W. F. BRADLEY.

PARIS, Dec. 20.—The whole interest of the tire section at the Paris Salon centered in dismountable rims. At the beginning of the year three French firms at most were constructing appliances for quick changes of tires; at the Salon there was hardly a stand without some form of quick-change rim, emphasizing a remarkable advance within the year.

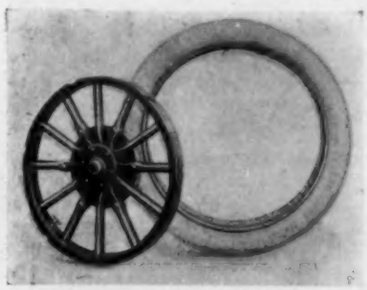


VINET RIM SECURED BY MOVABLE WEDGES.

The M. L. Company, one of the first to present a dismountable rim, showed a model similar to those employed in the Grand Prix and the Vanderbilt Cup contest. On the latest model the dismountable rim can be reversed and secured to projecting bolts on the face of the rim, for convenience in changing an outer shoe. Formerly it was necessary to take the rims off and struggle with them on the floor or on a table. By the new method changes of tires on spare rims are easily carried out. Szisz won the Grand Prix largely owing to his M. L. rims, using an American brace for taking off the nuts. With the new model an improved brace is supplied, known as the "revolver," from the fact that it takes up the nuts as they are unscrewed and holds them one behind the other within itself. The nuts have never to be touched with the fingers, so there is no danger of them falling to the ground. The box key has within it a coil spring pushing a metal disc to within a certain distance of the mouth of the key. Around the tube are three long, flexible, steel blades, each with a projecting head passing through a hole into the interior and close to the mouth of the tube. As each successive nut is engaged on the key it passes behind the spring heads, and is thus prevented from falling out, while the coil spring behind keeps it pressed against the heads in position to be engaged again on the bolt. With this tool the six nuts can be taken off and put on again in less than a minute.

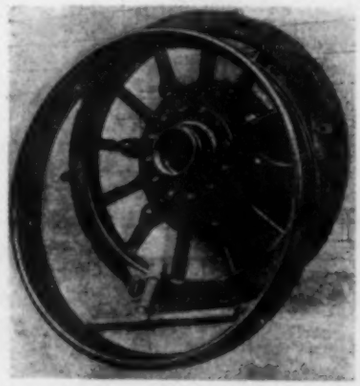


METHOD OF SECURING MICHELIN


VULCAN DISMOUNTABLE RIM.

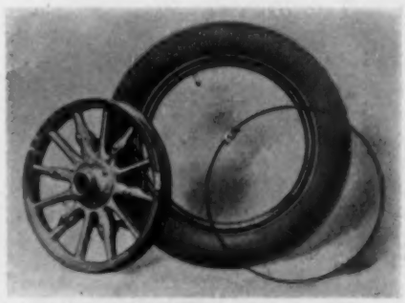
The Vinet dismountable rim, the principal rival of the M. L., and one which also stood its test in this year's European races, was shown without any changes on the model already described in these columns.

Michelin, who brought out a dismountable rim at the time of the Grand Prix, has now an improved model, which he states will be ready for delivery early in February. Instead of metal wedges forced between the fixed and the movable rim, which had a tendency to stretch the latter and finally cause it to burst, the movable rim is secured by eight hooks clasping round its curved surface and held in position on a bolt projecting from the face of the wooden rim. The fixed rim has a steel surface with a groove, into which a projection on interior face of movable rim keys to prevent creeping of one rim on the other. In the accompanying sketch *A* is the hook, *B* the bolt passing through it, *C* the movable rim, D the fixed metal rim, and *E* the wooden rim.


SAMSON PATENT RIM.

Jenatzy, the famous Mercedes driver, bases his dismountable apparatus on the principle of fixed steel wedges on the exterior surface of the fixed and the interior surface of the movable rim. There are about a dozen pairs of wedges on the two surfaces, and as each pair is brought together the wedging effort is increased. To secure the two rims, a flat steel wedge with a bolt at each end is inserted laterally and driven home with a hammer.

The Vulcan Tire Company presents two types of quick-change tires, the one providing for a change of inflated tire and rim, the other a dismountable flange for easy withdrawal of inner tube. For the latter operation the outer metal flange is movable, and has on its inner surface a number of projecting flat-headed studs entering into holes prepared for them on the metal face of the wheel. A slight forward movement of the flange drives the studs home in their grooves and a single screw prevents further movement. The type providing for change of inflated tire and rim has steel-faced fixed rim and ordinary movable rim. On the face of former are a number of diagonal grooves running contrary to forward motion of wheel; and on the movable rim are corresponding flat-headed studs.

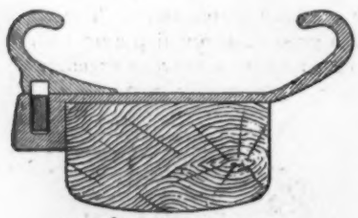

SADJAL RIM WITH EXPANDING BAND.

Samson, the leather tire manufacturer, has a rim similar to the Michelin and the M. L., secured by means of six cams on the outer surface of the fixed rim. When turned into closed position a spring prevents further movement of the cam. A box key placed over the nuts to release the cams presses on the head of the embedded spring, allowing free movement. A complete valve

LE RÊVE CIRCULAR BAND WITH LOCKING APPLIANCE

is left on the Samson, provision being made for it by a hole in the fixed rim.

The Sadjal rim is of the Vinet type, with projections and grooves on movable and fixed surfaces, and final locking by a broken circle with right and left thread screw for closing up.



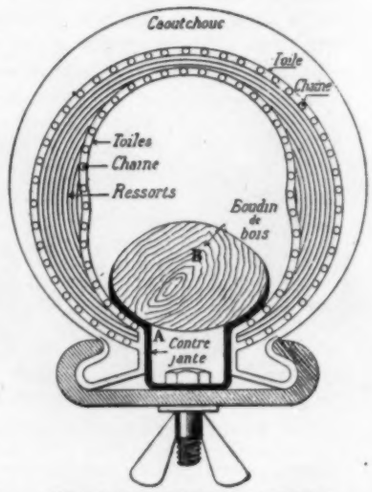
LE RÊVE RIM UNLOCKED.

LE RÊVE RIM LOCKED.

Le Rêve is on similar lines with the difference that the broken circle is fixed within grooves and expanded by a strong spring. By pulling down a single lever the expanding band is reduced in circumference, allowing the movable rim to slide off.

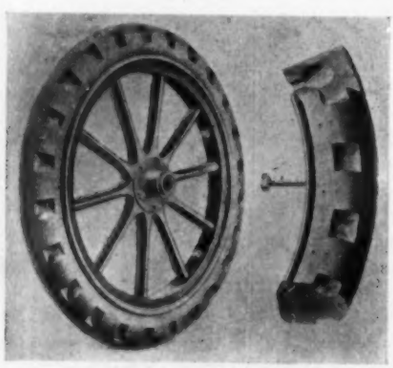
The Sider is one of the most original of several attempts made to produce an unpuncturable tire. It has an outer surface of rubber on the usual canvas basis, behind it several layers of semi-circular steel with interpositions of woven cloth. Half the space usually occupied by the air chamber is empty, the other half is fitted with separate blocks of wood held in position by security bolts, wedging the outer shoes exactly as is done by an inflated air chamber.

Elastès is a composition with a rubber basis which is boiled to a liquid point and molded to the shape and size of an air tube. A protecting band is placed round it and the mass put inside an outer shoe. The composition can be made to any consistency to suit different weights. A powerful company has taken up the patent and has secured the adoption of these solid tires on Paris cabs.



SIDER UNPUNCTURABLE TIRE

The Ducasble is a tire seen at the show last year and presented now in an improved form. It is a rubber tire with a number of small independent air chambers, each one about the size of an egg. As each chamber comes in contact with the ground a certain quantity of air is driven out through a small hole on the side of the tire, fresh air being drawn in as soon as pressure is removed.

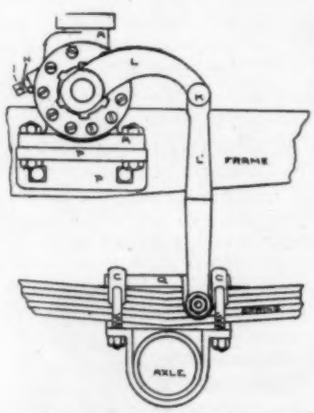


THE DUCASBLE RIM.

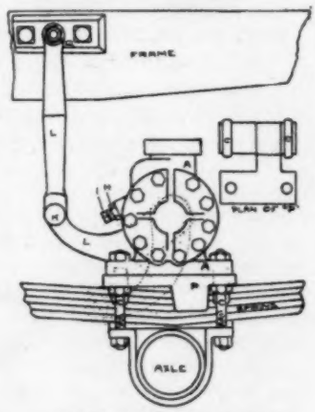
J. S. Fougerat has an economical tire protector. An old shoe, or one that is showing signs of wear, has its heels cut off and a large number of hooks riveted along each edge. To prevent the metal coming in contact with the under tire the canvas is opened along its edge and the hooks inserted between two layers. This protecting band is placed over a good tire, the hooks acting just as the original heels did in holding it on the rim by pressure from the air chamber. Other firms have the same kind of hooks fitted on new bands to place over an ordinary pneumatic automobile tire.

A HYDRAULIC SHOCK ABSORBER.

Shock-absorbing or spring-retarding devices, of which there is at present such an apparently diverse assortment on the market, may be divided in reality into three groups, depending on the basic principle of their operation. These are friction, pneumatic and hydraulic devices, and the majority are of either the first or the third class. Probably the most prominent of the



APPLIED TO CAR FRAME.



APPLIED TO CAR AXLE.

last-named order, and which may be said to occupy a position of its own, is the Hotchkin Anti-Jolt device. It is unique in that it is not designed to absorb the jar and jolt, but to eliminate them. And the latter occur on the up-thrust, when the springs, which have been forcibly compressed, expand rapidly and literally throw the body of the car and its occupants. The Hotchkin Anti-Jolt device, which acts on the same principle as that applied to modern high-powered guns to take up the recoil, consists of a piston and cylinder, the latter being divided by a partition in which an adjustable valve is placed. The cylinder is filled with glycerine, excluding the air, and the action of the piston forces it through this valve, the device being so placed as to allow the springs their natural flexibility on the down-thrust, the piston starting to retard the upward movement as soon as they have reached the lowest point of their compression. The device may be readily adjusted to adapt itself perfectly to any car from a light runabout up, merely by altering the opening of the by-pass valve mentioned. This is done from the outside by loosening a lock-nut and setting up or unscrewing the valve adjusting screw. The device is also easily applicable to any type of car and is equally efficient in any position. The methods of applying it to either the axle or the car frame are shown by the accompanying line illustrations.

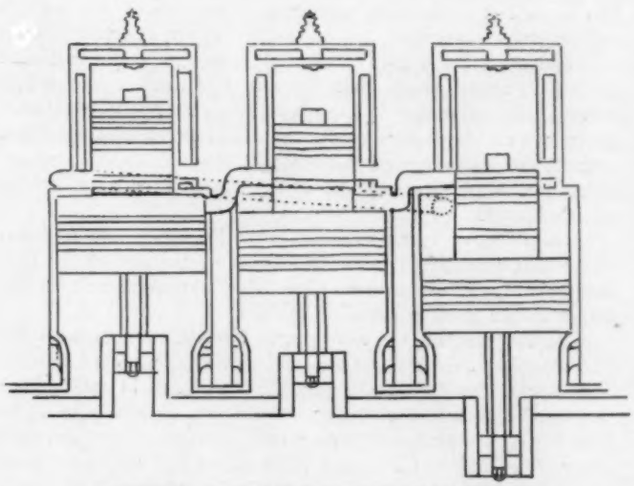
PECULIAR PROPERTIES OF WOOD.

Wood is possessed of several peculiar characteristics where its employment in connection with an electric current is concerned, and a knowledge of them on the part of the autoist will probably serve to make plain some otherwise puzzling conditions. When dry, wood is an excellent insulator, but this quality disappears with its dryness, the current finding a path across the wet surface; when charred or blackened by heat it also becomes a good conductor, but when reduced to ashes it is again a non-conductor.

DEVELOPMENT OF THE TWO-CYCLE ENGINE—PART II*

By C. P. MALCOLM.

THERE is another type of engine that involves much of the same general principles as the independent supply cylinder class that we have just described, and much that we have said of it will apply equally well to this. In this class the lower or pump end of the piston is enlarged. A good proportion is to make its diameter one and one-half times that of the power end; a 4-inch bore cylinder would have a 6-inch bore air pump. As



PROPOSED DOUBLE PISTON TYPE OF TWO-CYCLE.

there is no water jacket or air-cooling fins around the air pump end these cylinders take up no more room than an ordinary gas engine cylinder, but the enlarged end gives it a more symmetrical look, and it does not have a top-heavy appearance. The upper part of the air piston is used as the pump and the air is drawn in and expelled from the space between the cylinder walls of the pump and the trunk of the power piston, and with the sizes we have given it will pump one and one-quarter times the volume that the power piston would. There are three cylinders with their cranks 120 degrees apart, and the up stroke of the cylinder on the end will feed into the inlet port of the cylinder next to it; the latter will in turn feed the cylinder on the farther end and it will feed back into the first cylinder. By this arrangement the inlet port of each cylinder closes a little before the pump feeding it has completed its stroke and the full volume will not be delivered with the dimensions that we have given, but the volume delivered will exceed the piston displacement of the power cylinder.

Independent Supply Cylinder Type Considered.

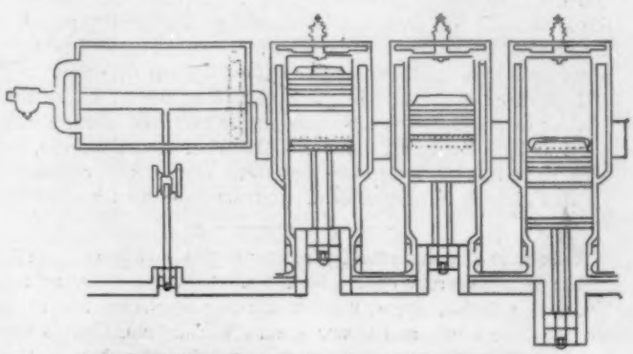
A better form of construction for this type of engine is made by following the lines pointed out in our study of the independent supply cylinder type, having all of the pumps discharge into one conductor, common to all of the inlet ports. Then each cylinder will take its full charge when its port opens, regardless of which pump is furnishing the supply. In this way there will be no compression above that necessary to make the transfer of the charge from the pump into the cylinders, because some one of the three inlet ports is open more than three-fourths of the time, while in the other way there is considerable more than one-third of the air pump stroke made before the inlet port of the cylinder that it is supplying opens. Considerable of the time two cylinders are pumping at once. By using the single conductor the full one and one-fourth volume of charge will be delivered into the cylinder each time. The engine can be regulated by the throttle and the relief valve method, described in connection with the independent supply pump system, and this is much the better way to regulate. A simple revolving cylinder valve can be made, extending so as to embrace all three of the cylinders and controlling both the intake and the outlet of all of the pump cylinders accurately. This is cheaper, more positive, and more satisfactory in every way than using check valves. This revolving cylinder valve can be run with a silent chain and sprocket or by gearing, making it revolve in unison with the crankshaft.

While the check valve action is almost a necessity in four-cycle practice, the excessive heat making rotary or sliding valves impracticable, and a piston valve, the only alternative, is not only expensive, but cumbersome, there is generally no excuse for using check valves in two-cycle practice. Simple methods of obtaining the required action with rotary and sliding valves are available and are much better and more satisfactory in practical use, being free from jerk and destructive jar. This engine will give better satisfaction when built with a rotating cylinder valve than any other mechanism of its class, making the same number of explosive impulses as six cylinders of the four-cycle type and its action as flexible and as easily controlled in every way.

Some Conclusions Which May Be Arrived At.

Both this type of engine and the independent supply cylinder type, in the perfected form that we have described, are such a long step in advance of the four-cycle that it can only be a question of getting a few of them before the automobile public, so that they will know that there are such engines to be had, before they will take their proper place in the foremost rank of automotors. There is no question but what a three-cylinder engine of either of these types will develop more power than six four-cycle cylinders of the same size, with not to exceed one-third of the mechanism, and that of a simpler and much more durable kind and only one-half the weight. The value of this light-weight feature will appeal with overwhelming force to those who have been connected in any way with building racing machines and have had to keep the weight down to a certain definite limit with the greatest power possible within that weight.

There are, of course, some who will doubt that a two-cycle engine can be made that will develop twice the power that a good four-cycle motor will, although it does get twice the number of explosive impulses. The laws governing the action of an explosive charge in a gas engine are certain and inexorable, and if certain conditions are complied with, certain results are obtained. If the charge in the cylinder is pure, the most powerful explosion possible will be obtained, assuming the same compression in every case, regardless of the "cycle" of the engine. The explosion will be less powerful in rapidly increasing proportion to the quantity of foul gases there are mixed with the charge. Of course, if the cylinder be not charged to its full



INDEPENDENT PUMP WITH RECEIVING CHAMBER.

*Continued from THE AUTOMOBILE, December 27, pages 915-917.

capacity, some burnt gas will be left in it, as it is full of exploded gas at the end of each stroke.

The ordinary two-cycle motor does not develop twice the power of a four-cycle; that is, its explosive impulses are not as powerful as those of a four-cycle engine, because we do not get into its cylinder as full a charge as we do into a four-cycle cylinder. The amount of charge drawn in varies acording to the design of the engine. We consider that the design given in part one of these papers marks the closest approach to good practice in this respect, but it will not deliver into the cylinder quite the full quantity; there will be a few ounces of pressure in the crankcase when the piston begins its up stroke, and this pressure represents the amount of charge that should have gone into the cylinder, but did not.

Forcing the Gas Into a Three-port Motor.

When we take the three-port engine, and probably three-fourths of the two-cycle engines, built to-day are three port, we find that not more than two-thirds of the charge that is supposed to go into the cylinder actually does so. We will suppose that the stroke of a three-port engine is four inches, the inlet port of the cylinder is five-eighths of an inch and the inlet port to the crankcase is also five-eighths of an inch. (They are often nearer an inch.) Of course no compression takes place in the crankcase until the piston has descended the width of the port and covered it, after which what charge there is left in the crankcase is compressed and will go into the cylinder as soon as the inlet port is uncovered by the piston. As soon as the piston begins its up stroke it produces a vacuum in the crankcase, and it will suck back from the cylinder into the crankcase again until the cylinder port is covered by the up stroke of the piston. Thus it will be seen that all of the stroke of the piston, measured by the width of the port admitting the charge into the crankcase, plus the width of the inlet port of the power cylinder, is lost, as far as getting charge into the cylinder is concerned. We only have two and three-fourths inches out of the original four-inch stroke that will be actually useful in putting charge into the cylinder. When we remember that even this is not all delivered into the cylinder, there being other losses incidental to all transfers of elastic gases from one space to another within a given time, we see abundant reasons why the explosive impulses of such an engine should not be as powerful as those of a four-cycle, as well as for the general distrust of two-cycle engines, when that type of two-cycle motors is the best that we know of.

A NEW TIRE FILLING COMPOUND.

Numerous efforts have been made to discover a substance that would possess the property of resiliency in a high degree, without at the same time having the disadvantages of melting at a low temperature, that would not decay or disintegrate and that would not injure the rubber of the tire into which it was injected. Attempts to discover such a material date back to early bicycling days, but none of them proved an unqualified success, and few, if any, have survived to this day. Now L. S. Lewis and C. H. Cooley, of Hartford, Conn., think they have hit upon the secret. Their compound is injected in a molten state and is not affected by ordinary changes of temperature as well as being proof against oil and grease; nor does it harden with age. Several Hartford autoists have tried the new substance in the tires of their cars and vote it a success, as the result of which a company, to be known as the Elastro Manufacturing Company, has been organized with $50,000 capital to market the compound. H. B. Philbrick is its president. Patents have been applied for.

A Tourist Trophy race for motor cycles has been included in the 1907 program of the **British** Auto Cycle Club, to take place, if possible, the day after the **car event** on the Manx course. The costly and weary Land's End-**John** O'Groat's trial has been discontinued and a six days' reliability **tour,** with start and finish in London, will take its place.

ANTI-SKID AND SMOOTH TIRES.

At this season of the year, when anti-skid tires are so generally used, it is well to remember that all shoes with a rough or steel-studded surface have a shorter life than smooth surface tires. M. Michelin, the tire expert, has given the following explanation of this: Every tire is composed of two distinct parts, the carcass which gives the support and the internal air pressure, and the web, frequently vulcanized on the carcass and which may be round, flat, or anti-skidding. The web is the part of the tire which comes in contact with the ground and has to resist road friction. The carcass only receives the reactions of the road through the web, and it is thus easy to see that the nature of this latter has considerable influence on the life of the tire. If two similar carcasses are taken, and one covered with a smooth web and the other with an anti-skid surface, it is the anti-skid tire which would perish first. An anti-skid band is intended to prevent side movement, and to obtain this result metal rivets are interposed on the surface of the tire, this interposition causing a considerable adherence of the tire with the road, and in consequence an integral absorption of all effort or reaction by the anti-skid band.

To be effective every anti-skid must be harsh, and unfortunately it is only harsh to the detriment of the life of the tire. Whatever may be the nature of the band, a steel-studded surface always causes greater strain on the tire.

A smooth tire, on the contrary, has less adherence with the road, slipping over the ground under the influence of harshly applied brakes or a too sudden start. The carcass in consequence is subject to less strain. By careful driving, especially by judicious use of the brakes, the causes of deterioration of anti-skid tires can be diminished. But if the same careful treatment were given to smooth tires their life would be lengthened in increased ratio. As a set-off against the shorter life of anti-skid tires is the fact that they are rarely punctured by stones, glass or nails.

Drivers in long-distance European touring competitions are unanimous in declaring that good anti-skid tires never puncture. When they are worn thin they burst, but give no previous trouble.

A PUNCTURE-PROOF TIRE FROM AKRON.

Akron, O., Dec. 31.—L. Greenwald, superintendent of the tire repair department of B. F. Goodrich & Co., has invented a puncture-proof tire which at present is passing out of the experimental stage, as it has proven under exhaustive tests to be more than was anticipated. It is likely that steps will be taken before long to introduce and manufacture the tire. It is claimed for this tir that it answers all of the purposes of a tire that is not puncture-proof, which most so-called puncture-proof tires do not do, and at the same time it is fully punctureless.

The invention involves three constructions of puncture-proof tires, molded in the outer cover, on the inner tube and separately. Owing to the materials employed and the nature of its construction, the resiliency or present features of the tire is not affected in the least. The old cases in which the protector is used in this tire are kept whole on account of the reinforcement and the elimination of blowouts resulting from rupture in the outer case or from an imperfection in the material or construction.

In connection with the protector there is a special construction of tube, and this combination practically eliminates all injury except natural wear.

The nature of the test to which the tire has been subjected successfully indicates its worth. The tire was placed on an auto owned by a physician and a pound of nails and spikes were driven into a plank and the plank fastened to the floor. Then the car was driven over the sharp points, first slowly and then fast, and the tire came out of the test uninjured, it is claimed.

Bosnia is the first country in Europe to issue a postage stamp with the picture of an automobile, the new 50 hellers bearing such an impression.

STEAM FOR PUBLIC SERVICE VEHICLES

STEAM as a motive power for public service vehicles was the subject discussed at the monthly meeting of the British Institute of Mechanical Engineers in a paper read by Thomas Clarkson, member, of Chelmsford, England. He said in part:

"The selection of the motive power for public service vehicles must be considered in its relationship to the public safety and the convenience, as well as with respect to the state of the art. It has been commonly supposed that steam was unsuitable, and assuming the ordinary methods of application, this conclusion is probably correct. The question arises: Is one justified in assuming that ordinary methods represent its highest possibilities? One object of this paper is to show that this is by no means the case, and that recent developments in the methods of harnessing steam for public service have entirely altered the situation.

Some Advantages That Are Claimed for Steam.

"In 1905 the first double-deck steam omnibus of the author's construction commenced regular service, and at present there are about forty licensed in London. The advantages of steam for public service may be generally summarized as follows:

The employment of a safe and cheap fuel.
Freedom from noise, vibration and smell.
Smooth and silent action of the machinery.
Quick acceleration, flexibility, and ease of control.
Large reserve power for hills and for starting.
Entire absence of change-speed gears and friction clutch.

"To realize these important advantages a perfect steam-generator is necessary. Here the principal engineering difficulty has been encountered. The usual methods are characterized by smoke, dirt, constant attention to water-feed and stoking, trouble from priming, incrustation, and leakage. Therefore it is safe to conclude that the usual methods are unsuited for the purpose. To produce a generator free from the above vices has proved a serious problem. It is surprising to many engineers to find that steam can be generated automatically as required, and that the generator has been made, for all practical purposes, foolproof.

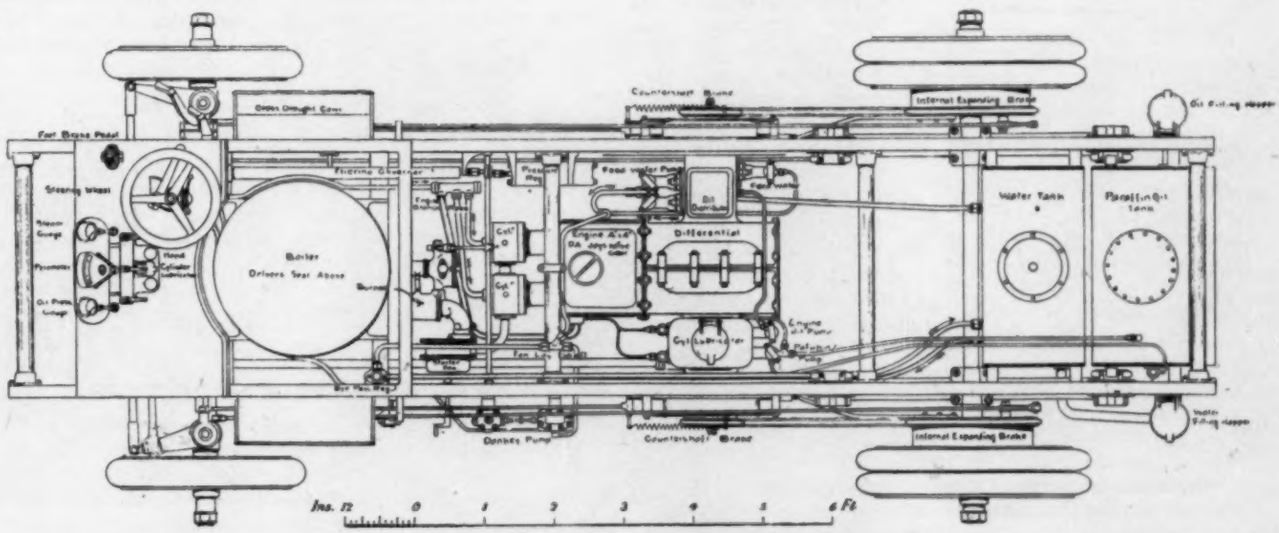
"For the purpose of description, the generator may be conveniently divided into three parts, namely, the burner, the boiler, and the governing gear.

"The burner is constructed upon the principle of supplying kerosene under constant pressure to a vaporizer, in which it is transformed to a gaseous state. The vapor is mixed with air—on the Bunsen principle—before ignition takes place, and the heat maintains the temperature of the vaporizer.

Concerning the Burner and Oil-supply.

"The main fuel-supply is carried in a tank not subjected to pressure and therefore can be replenished quickly without extinguishing the burner. The kerosene is pumped from the main tank into a pressure tank of solid-drawn steel, which is about half full of air. This forms a cushion which keeps the burner fed when the car is standing and the pump not delivering oil. The surplus oil delivered by the pump escapes through a spring-loaded relief-valve set to about 40 pounds' pressure and returns to the main tank.

"Simple and expeditious starting of the burner has received much attention. Preliminary heating with alcohol is slow, uncertain and expensive. The employment of the two fuels (one for starting and another for running) is also objectionable. The preliminary heating is now done in one minute with kerosene, and the heat obtained as follows: A cast-iron box contains several asbestos wicks saturated with kerosene which readily ignite from a match. A current of air is blown from a fan into one side and through the other side of the box a strong flame is driven. The flame is directed against the body of the burner so as to ignite the mixture as soon as it appears. This arrangement will start the main burner in fifty seconds, and the omnibus can move by its own steam in ten minutes from 'all cold.'



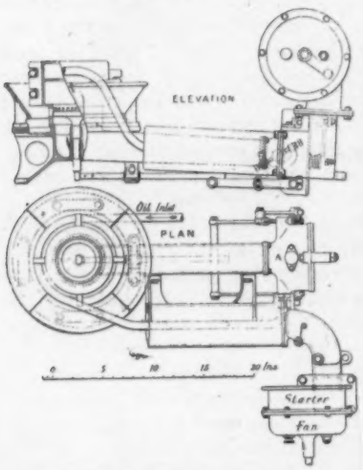
PLAN VIEW OF CHASSIS CLARKSON STEAM OMNIBUS

Only Water Tube Boilers Are Used.

"The boiler is constructed wholly of water-tubes. These are disposed so as to absorb the maximum heat from the products of combustion before the latter are allowed to escape, by employing the regenerative principle. The tubes nearest the fire are maintained at a fairly constant temperature by a thermostat and the water-feed is governed directly by the steam pressure.

"The governing gear is a most vital part of the generator combination, since upon it depends the very existence of the boiler itself. It may be divided into fire-control and water-control. It must be understood that the full power of the burner is in excess of the maximum demands for heat, and the flame is continually checked by the governor, regulating the supply of steam in accordance with the variations of the load. The main principle is

the maintenance of an equable temperature in the steam; in other words, the supply of heat to the generator is governed by the temperature of the steam generated. The employment of highly superheated steam is essential for economical working and 700 to 800 F. is found to be a convenient temperature. The automatic water-control of the generator is in the form of a by-pass regulated by the steam pressure. The pumps are always taking the full charge of water, which is either delivered into the generator, or allowed to return to the tank, should the by-pass be open. There is no intermediate condition.



BURNER AND STARTER DETAILS.

The Engine.

"The engine has two horizontal double-acting cylinders, 4-inch bore by 4-inch stroke, in two separate castings. They are attached to distance-pieces bolted to the outside of the aluminum gearbox, which contains the crankshaft, crossheads, connecting rod, and all the valve motion. It is found convenient to place the valves for the distribution of the steam beneath the cylinders, as this dispenses with the necessity for the employment of draincocks for removing the water of condensation at starting. The valves are of the piston type fitted with rings, and are actuated by Joy gear. This enables a very simple form of crankshaft to be employed, built up of two parts, each forged out of the solid and bolted together with a steel spur-wheel in the center. The cranks are at right angles. No adjustment is provided, but large and well-fitted surfaces of the hardest bronze working against a hardened and ground steel face are provided and with a constant flow of oil over them. Such an engine will run 30,000 miles without developing any appreciable knock.

Some Features of General Arrangement.

"An air-condenser is placed in the front of the chassis, forming the front of the bonnet, and in this is housed the generator. The engine is between the generator and the rear driving-axle. The cylinders lie horizontally and forward of the engine. The engine-gear is completely inclosed and the motion is transmitted from the crankshaft to the differential by the spur-gear in the reduced ratio of 3 to 1.

"The differential is of the spur type, which is preferred to the bevel type on the score of simplicity. The differential shaft carries the eccentrics for actuating the pumps, and to its outer ends are fitted brake-drums and also the chain sprockets. No change-gears or disengaging clutches are employed.

The Brakes and Their Application.

"Three independent brakes are provided. The first brake is operated by a foot lever and causes blocks to be applied to both sides of 18-inch drums fixed to each of the ends of the differential shaft. The second brake is actuated by a side lever which causes two segmental blocks to expand within a drum, bolted to each of the driving wheels; the brake load is balanced in a similar manner to the foot brake. The third brake is available in the engine, since by merely reversing the valve-gear a considerable resistance is offered to the movement of the car, even if steam is shut off.

Concerning the System of Lubrication.

"General lubrication of the engine and differential gear is by a system of pump circulation combined with an automatic distributing valve, supplying oil to each of the bearings successively. The engine and differential cases are combined, and a well fitted at the lowest point. Into this all the surplus oil drains from every bearing, and from it the oil is delivered by a force-pump into a circular valve-box connected with every bearing of the mechanism. To provide against the possibility of any of these distributing pipes becoming fouled or obstructed, a circular valve is provided which covers up all the outlets except one. This one therefore takes all the oil delivered by the pump. The distributing valve is slowly rotated by a worm gear on the differential shaft, the oil is automatically transferred from one bearing to another, and the possibility of stoppage is avoided. The system has the important advantage of taking out of the hands of the driver the responsibility for attention to lubrication, particularly for the high-speed mechanism.

"Owing to the temperature of the steam a high grade of hydrocarbon oil must be used for the lubrication of cylinders and valves. The result of the author's experience has led him to adopt a system of force-pump feed. An aluminum box, forming the reservoir for cylinder oil, also contains two pumps, the plungers of which are forced down sharply at regular intervals by a cam-operated spring. There is no packing of any kind in the pumps, but the plungers are made a good fit. After the cylinder lubricator has been charged, no further attention to cylinder lubrication is necessary for 1,000 miles. It merely requires periodical inspection and replenishment from the engineer in charge of the garage.

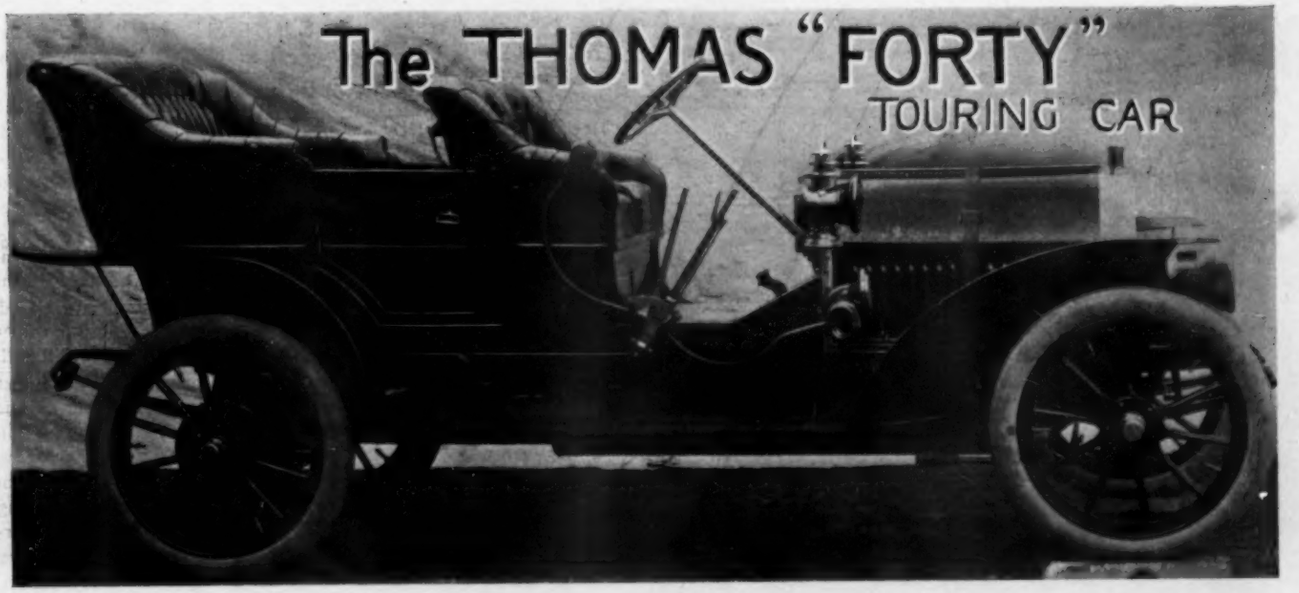
Conclusions Deducted from the Test.

"The mileage done by the car in question is as near as possible 27,000 miles (7th October). The only replacements to the engine are: piston-rod bushed, crosshead guide bushes, piston-rod sleeves and piston rings. The total cost of materials comes to about $8. The valves in pumps have never been ground or their seats touched. The lubrication of engine and cylinders has been most satisfactory and the automatic lubricators have given practically no trouble. The fuel consumption averages one gallon to 4 1-3 miles."

ROBERT L. DUNN'S WAR LECTURE.

WASHINGTON, D. C., Dec. 29.—A lecture complimentary to the Automobile Club of Washington through the courtesy of the Pope Automobile Company, of Washington, was given at the New Willard by Robert L. Dunn, the well-known war correspondent. The lecture consisted of notes on the Russian-Japanese war and was a connected pictorial narrative of the greatest conflict of modern times. In a very modest way Mr. Dunn told how he landed in the Orient two weeks before hostilities commenced and without waiting for credentials started for the prospective scene of operations, Korea. He landed at Chemulpo early in February, and by some strange freak of newspaper luck the war began under his very eyes with the landing of the first Japanese army and the destruction of two Russian war ships. Mr. Dunn was introduced by President Duvall. The programs were unique, being printed on Chinese paper, bound with a piece of straw rope to which was knotted a piece of Chinese money.

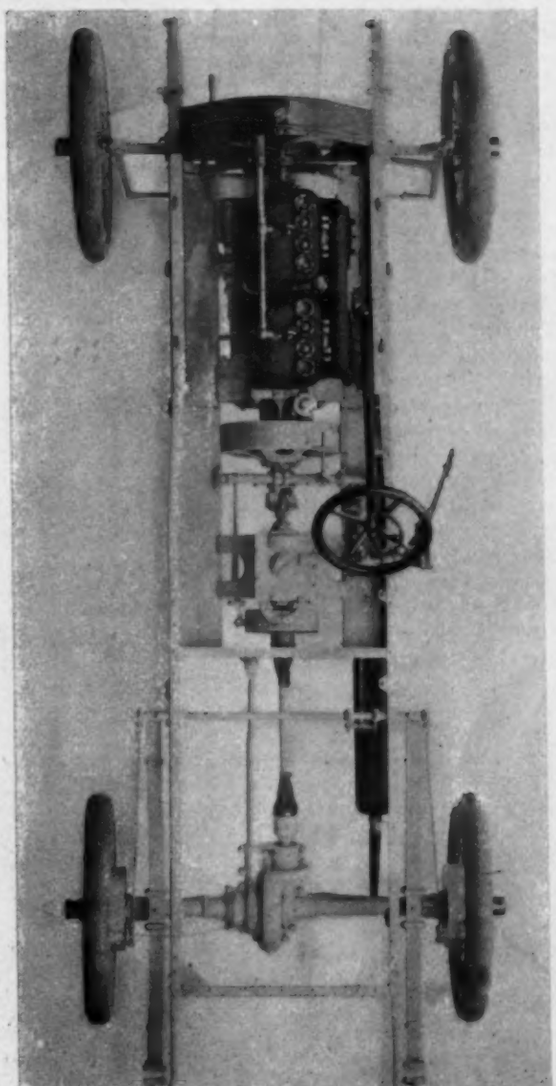
For the better protection of its extensive warehouses and docks at Huelva, in Spain, the Rio Tinto Copper Company has recently acquired a powerful and interesting gasoline motor fire-float, in which the vessel itself and the pumps for throwing the water jets are driven by this type of motor. The gasoline motor is of the vertical type with six cylinders, developing 60 horse-power, and drives a single screw propeller through a clutch and shaft. The pumps for discharging the jets are driven by the gasoline engine through clutches, and their combined capacity is 1,200 gallons per minute. Each pump supplies three hose connections on deck, capable of throwing 1 1-2-inch, 1 3-4-inch and 2-inch jets respectively, or the entire delivery can be directed into one swiveling monitor throwing one large stream.



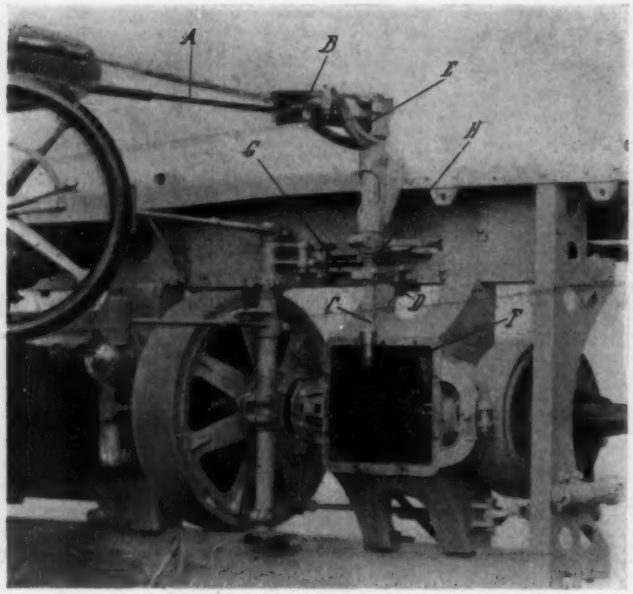
JUST what standard of design would be followed in the evolution of the Thomas "Forty," or whether conventionality in this respect would be entirely departed from and something entirely original be produced, has been a matter for speculation ever since the announcement of the linking of the Thomas name with the new Detroit plant. Conjectures on the subject have suddenly been set at rest by the appearance of the new car—not merely as an advance model, but in numbers in the shape of cars already in the possession of their owners. When the plant was first put in operation last summer, a schedule of deliveries was outlined and this has been adhered to, resulting in the appearance of the new Thomas "Forty" in different parts of the country at the same time.

A glance at the car as well as its specifications shows that it is intended as a candidate for the ranks of that class that contains only too few representatives—the medium-priced touring car of high capacity, speed and power in comparison with its weight and cost of maintenance. This is evident from the fact that in complete running order, with a generous lamp equipment, the car lists at $2,750. It is made both as a touring car and high-powered runabout, the chassis being substantially the same in both cases with the exception of those detailed changes necessary to fit it for the latter rôle, such as raising the gear ratio.

Motor Design.—It is at once evident that it has been the aim of the designer throughout, not alone where the power plant is concerned, but the entire car, to along lines of extreme simplicity, a fact that is apparent at the first glance at the motor. It is plain that the combined experience of other makers has been drawn upon and their mistakes avoided, and this, together with the knowledge of what is most needed in such a motor, has combined to produce a power plant that has been reduced to its lowest terms and which possesses the advantages of extreme simplicity and ease of adjustment in a superlative degree. Thus the valves, valve mechanism, spark plugs with their connections and the carbureter are all centered on the right-hand side of the motor, making every part of the latter accessible by lifting one side of the bonnet. An interchangeable system of making the parts has been adhered to throughout, so that not alone the valves but pistons, connecting rods and all other parts are likewise interchangeable, a limit of variation of one-half-thousandth of an inch being maintained. Drop forgings of special steels are employed for the crankshaft and connecting rods and the best grade of iron obtainable for the purpose is used in the making of the pistons and rings. The piston pins are hollow and of large diameter, being clamped in the connecting rod end. All bearing surfaces have been designed of generous length and all the main bearings are interchangeable. They are of special anti-friction metal shaped under heavy hydraulic pressure, and while liners are furnished it has been found that the bearing



TOP VIEW OF THOMAS "FORTY" CHASSIS.



TRANSMISSION AND CONTROL LEVERS.

surface provided is so ample that adjustments are not required until after a lengthy period of use. All bearing caps are heavily ribbed to prevent distortion and four bolts are provided at the big end of the connecting rods instead of two as is usually the case, in order to permit of a more even adjustment of these bearings than is ordinarily possible.

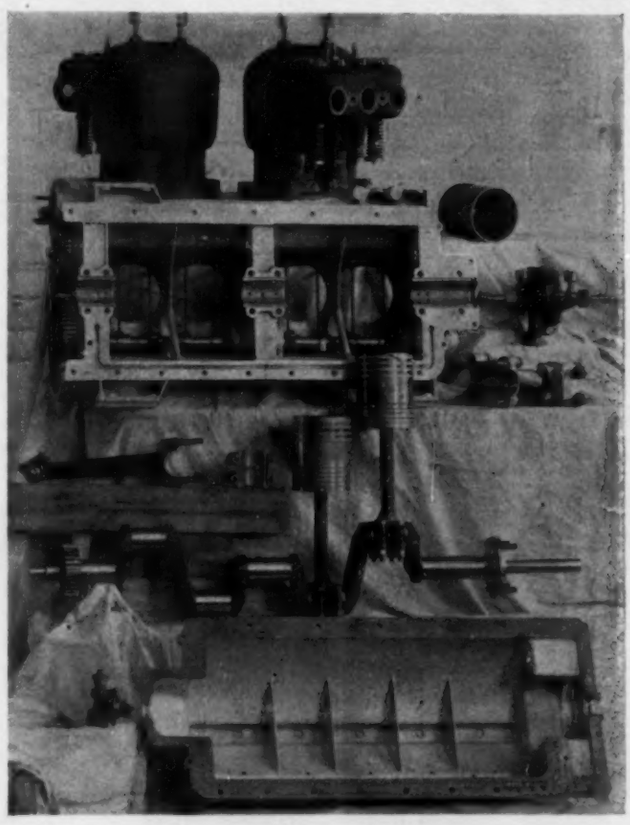
An original and interesting departure from standard practice is embodied in the valve-operating mechanism, rendering the setting of the valves readily adjustable. Side thrust is eliminated by interposing a roller between the cam and the valve lift. This roller is carried by a light steel arm pivoted on the opposite side of the crankcase across which it extends. It is encased on top and upon this case the valve lifter rests. The cam strikes the roller directly, imparting a vertical motion to the valve lifter, thus avoiding side thrust and its wear. The opening and closing points of the valves may be readily verified by means of a pointer fixed to the crankcase in connection with the usual marks stamped upon the periphery of the flywheel. The aluminum crankcase is bolted to the frame horizontally instead of vertically, and the cylinders are given a one-inch offset on it in order to minimize the side thrust on the power stroke. The compression is 75 to 80 pounds and the motor delivers its rated output of 40 horsepower at a moderate speed.

Motor Accessories.—The carbureter is of the automatic compensating type with the usual float feed and has been designed to effect fuel economy as well as a minimum of necessity for adjustment. Following a tendency that has developed of late, the timer, which runs on ball bearings, is placed directly beneath the footboard, so that the raising of the latter makes it particularly accessible. The remainder of the ignition system consists of a four-unit coil on the dash with a set of accumulators as current supply and dry cells as a reserve. A bracket designed to accommodate any standard magneto is provided on the crankcase, directly in line with the pump shaft, so that fitting this form of current supply presents no difficulty whatever. Any magneto desired will be installed on the car as an extra.

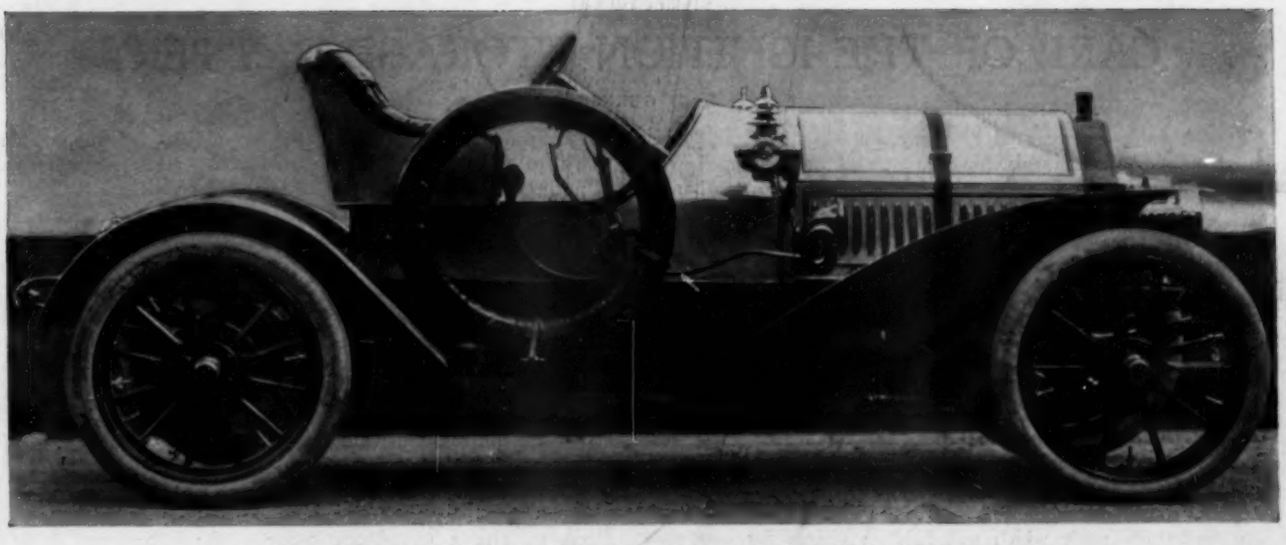
For cooling, a radiator of the vertical flat tube type, which has been found to give such a high degree of efficiency, has been adopted. In the course of tests, the tubes of a radiator of this type have been expanded to several times their normal size, showing that it would not be damaged by freezing. The water is circulated by means of a centrifugal pump, gear-driven from the camshaft. The suspension of the radiator is unique in that no side supports are employed; it is merely bolted to a bracket beneath, which carries its weight, and is supported at the top by a brace rod extending to the dash. In this way the twists and strains of the frame in traveling over bad roads are not communicated to it and one source of annoyance—that of a leaky radiator—is well avoided. A belt-driven fan running on ball bearings placed directly behind the radiator completes the cooling system. The fan belt is made adjustable by means of a single nut. Drain plugs are placed in the lowest part of the jackets so that the latter may be completely drained whenever this becomes necessary.

Particular attention has been paid to the matter of lubrication, with the result that a system that is at once highly efficient and extremely simple and certain in operation has been devised, even the casual observer noting the total absence of oil pipes on the exterior of the motor. The system consists of an oil well or reservoir in the shape of an auxiliary tank cast on the lower side of the crankcase, and an oil pump communicating with the main bearings of the motor, the whole being self-contained within the engine itself. As long as the motor is running, oil is being pumped from this supply well onto the main bearings, from which it overflows into the crankcase. Holes communicating with the reservoir or well are drilled in the crankcase at a certain height, thus insuring a constant level at all times, the oiling of the big ends and pistons being taken care of by the splash. A glass bull's eye is provided in the front end of the reservoir so that the amount of oil contained in the latter is evident at a glance. To further insure against any failure in the oiling system, the oil pump and the ignition timer are placed on the same shaft, any derangement of the latter that would cause the oil pump to cease operation also bringing the motor to a stop by putting the commutator out of commission. The timing and pump gears are all well inclosed and packed with non-fluid oil.

Transmission.—As the first step in the transmission of the power to the road wheels, an aluminum cone supported on a steel hub and with a leather facing backed by helical springs, engages the inner side of the flywheel. This conical clutch measures 16 inches in diameter and has been tested to hold more than the maximum output of the motor. The cone is ribbed



MOTOR OF THE THOMAS "FORTY" DISMEMBERED.



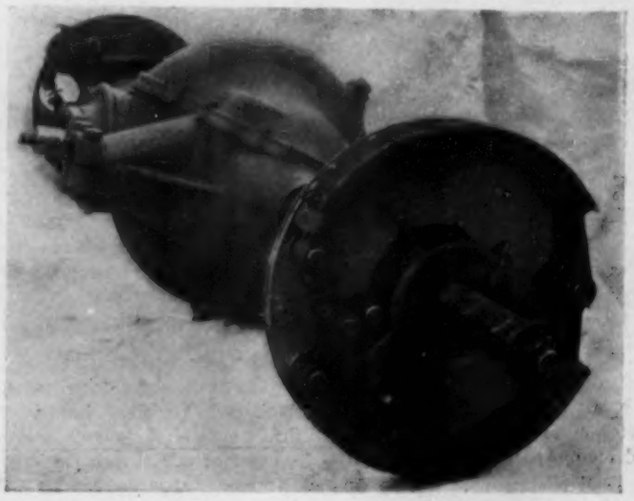
THOMAS "FORTY" SPEED CAR, WHICH DEVELOPS A GAIT OF 60 TO 65 MILES AN HOUR.

instead of being solid, in order to make it as light as possible, which, in connection with its small diameter, tends to overcome the faults of excessive inertia and momentum usually inherent in clutches of this type where insufficient attention has been paid to the matter of size and weight in their design. From the clutch the power is carried to the gearbox by means of a universal yoke or cross to allow for any relative movement between these two links in the transmission. In order to avoid the friction generated by the usual form of disengaging collar, this duty is performed by two steel rollers.

The gearbox provides three speeds forward and reverse and is operated on the selective system of gear changing, in connection with a novel system of control. This is made plain by the illustration, in which A is a band lever rocking about B as a fulcrum, C being thus movable endwise by means of a flexible connection E between this shaft and the lever A. The finger F in the gearbox engages either of the sliding gear members at the option of the driver; a second D, also keyed to C, engages at all times the interlocking slide G, permitting gears to be shifted only when the clutch is disengaged. The spring H holds the lever A when in neutral in such a position that the movement forward gives the intermediate or usual starting speed, while a backward movement throws in the direct drive or usual running speed. It is thus only necessary to move the lever H sideways from neutral against the tension of the spring to obtain either the reverse or low speed. The gears and shafts are of nickel steel, running on American roller bearings; stuffing boxes are employed to make the case oil-tight. A standard type of propeller shaft with universal joints at each end constitutes the connecting link between the gearbox and the rear axle. The universal joints are inclosed in leather casings and run in heavy grease, while the propeller shaft is made of a high-carbon steel.

Running Gear.—The rear axle is of the Timken semi-floating type and Timken roller bearings are used throughout the running gear. The front axle is a single piece I-beam drop forging of steel with the cross bar connection of the steering gear, which is of the screw and nut type, placed back of it. This provides protection for the latter when meeting light obstructions and is a safeguard against accident due to a deranged steering gear arising from such a cause. The suspension is of the semi-elliptic type both front and rear, the latter measuring 52 by 2 1-4 inches and the former 36 by 2 inches. A pressed steel frame of the usual channel section is employed, with a subframe dropped 4 inches for the support of the motor and transmission. A steel plate is riveted between the main and subframes, forming a portion of the scheme of dustproofing the entire mechanism and adding a continuous stiffening effect throughout the entire length of the subframe, which extends for almost two-thirds of the length of the car. The wheels are 34 by 4 front and rear for touring service and 34 by 3 1-2 front on the runabout, this being the only difference between the two other than the change in the gear ratio already mentioned. Extending beneath the entire mechanism a sheet steel dust pan the width of the subframe is placed. An ingenious clip permits its instant removal. The wheelbase is 112 inches and the tread standard, the touring body having a seating capacity of five. The weight is 2,550 pounds.

Brakes.—Realizing the great importance of this part of the car, its designer has gone to unusual pains to provide a braking equipment of more than sufficient capacity to take care of every emergency. Two sets of brakes are employed, the first or transmission brake, used for ordinary running and operated by a pedal, and the emergency brake, which is of the internal expanding type, is located in drums on the rear wheels. They are effectively encased in a steel housing to protect them from dirt, adjustments readily being made through the hand hole provided for that purpose. The transmission or foot brake consists of a 10-inch sheet steel band, with a 3-inch face, acting upon a steel drum bolted to the propeller shaft universal yoke. This band is lined with camel's hair felt, making it particularly effective. The suspension of this brake is worthy of mention in that a very simple and effective method of accomplishing this has been employed, which at the same time provides against the possibility of the band dragging when not in use. The spring shown in the illustration of the brake serves to hold it out of action when running.



HOW THE REAR AXLE LOOKS WHEN DISMOUNTED.

CARE OF THE IGNITION STORAGE BATTERY

By H. GERNSBACK.

IT is probably not realized by many autoists that over 80 per cent. of American gasoline automobiles are equipped with storage batteries for ignition, and a few hints on how to handle and care for such a battery will, no doubt, be welcome to the user. It is not the object to go into mere technicalities nor to explain the theory of the accumulator, but rather to state how to avoid a great many mistakes which have come under the observation of the writer. A storage battery of any make is a very complicated piece of electrical apparatus and has to be treated accordingly in order to obtain satisfactory results from it. The automobile manufacturer, who usually buys the battery with which he equips his cars, does not always find the time to go into details concerning batteries, and the owner of a new automobile should convince himself that the battery is up to its standard, fully charged and free of corrosion, before he puts out for a long trip. He should always bear in mind that there is no storage battery made which will hold its charge for over two months, and a new car that has been standing in a salesroom for a long period will be found not to work satisfactorily, or frequently not at all, if the battery was not kept charged properly. The general tendency is then to condemn the battery, which might be the best in the world, but if it is not kept in a state of usefulness by proper charging and care, its efficiency is totally destroyed.

Inspecting a New Battery.

A new battery should be first inspected to see if it has enough acid (electrolyte). To do this, unscrew the vents, or plugs, which are usually located in the center of each cell. The liquid must, under all circumstances, cover the plates, which can be seen by looking through the opening of vent tube. Should this not be the case, *distilled* water should be poured in each cell until the liquid stands at least one-fourth inch over the top of plates. It is not necessary to add acid, as only the water evaporates. The remaining solution, therefore, becomes denser and denser, and when distilled water is added the electrolyte will be brought up again to its proper specific gravity. Ordinary water should never be used in a battery, as even small quantities will invariably prove disastrous. If distilled water cannot be obtained, clean, filtered rainwater may be used to good advantage. The user should never attempt to take a long trip without previously testing his battery and a double test, which the writer never has known to fail, and which is described below in its essential details, ought to be made.

This comprises a voltage reading and a "sparking" test. Every cell should be tested individually by means of a low-reading voltmeter (0-3 volt) and as long as a battery shows 1.9 volts it will be found good for a 50-mile run. This voltage reading must be made while the engine is *running*, as a battery at rest will not give a correct reading, due to the recuperation. It is a well-known fact that an accumulator will show 1.9-2 volts per cell on open circuit, even if it was totally run down previously. As soon as the circuit is closed, however, the voltage will fall to 1.5-1.0 inside of half a minute. This property tends to mystify the layman a good deal. The "sparking" test must be done carefully and not oftener than absolutely necessary. As it is nothing but a dead short-circuit, which of course does not tend to improve the battery, the writer would not recommend the method if a better one were known; if, however, one is a little careful no damage will ever arise.

How to Test the Cells.

Procure a piece of insulated wire of 12-gauge about 8 inches long and scrape off the insulation at both ends for about one-fourth inch. Place one end of the wire firmly on one of the end binding posts of the battery; with the free end of wire touch the other end binding post rapidly in such a manner that the contact will not last longer than a fraction of a second. A loud, snappy, blue spark will be the consequence if the battery is well charged. If not, the spark will not be loud nor bright.

The writer does not recommend the use of an ammeter, for the purpose of investigating the total amperage of battery; ammeters are usually wound with such a low resistance that when a test is made, which in order to be fairly accurate has to last for about five seconds, directly short-circuits the battery, If this is done often it will ultimately ruin the battery, due to scaling and bending of plates. The "sparking" test also helps to find troubles which could not have been found with the volt meter alone. For instance, the writer often saw batteries which tested up properly in voltage but which could not be made to run the coil nor incandescent lights. The "sparking" test was applied, but without result. It was found that either corrosion had taken place, the connection bolts were loose, or oxidized, or else a lug which connects the plates was broken. After these troubles had been remedied the battery worked again as well as before.

When a Cell Is Fully Charged.

A freshly-charged cell should register 2.20-2.25 volts on open circuit and from 2.10-2.15 when the engine is running at high speed. From this point the voltage soon drops to 2.00, and from there very slowly to 1.90. In fact, three-quarters of the discharge lies between these two points. When the voltmeter once registers 1.80 volts the discharge should be discontinued, as at this point the coil will stop working abruptly, which is a hint to have the battery recharged at once. To get the maximum mileage from a battery the coils must be so adjusted that they take a minimum of current. No benefit is ever realized by forcing 4-5 amperes through a coil; in fact, it is detrimental to the platinum points, to the coil itself, to the timer, and to the spark plug. A four-cylinder coil should never take more than 0.75 ampere, when the engine runs at full speed. In order to achieve this, turn back all the vibrator thumb-screws in such a way that the tremblers just work without the engine missing fire. If once adjusted the coils should not be touched for the season, and one will get a good idea of the efficiency of the battery.

The average sparking battery, if well constructed, should last from three to four years, if it is treated properly, which means recharging it every three weeks, no matter if run down or not; even if it stands idle a charge should be given to it every four weeks, otherwise the plates will become sulphated (coated) very soon, greatly reducing the efficiency of the cells. To keep metal parts from corroding they should be coated with vaseline once a month. In order to prevent the battery from being thrown around in battery box, put some shock-absorbing material, such as machine waste, excelsior, or the like, under, and around the sides of the igniter. This will prevent it from breaking and from being damaged internally.

PASSING OF THE NAME "CHAUFFEUR."

It would appear that that ill-chosen Gallicism "chauffeur" has been doomed to be consigned to oblivion. England and America are agreed for once on the use of the same word to designate the same thing and that word is driver. By an imperial edict Germany has let it be known that she will have none of it; her chauffeurs will henceforth be "wagenfuehrers," and where there are two one will be the "hauptwagenfuehrer" and the other the "unterwagenfuehrer"—a generous mouthful in either case, but not disturbing to a Teuton. Even France has gone back on her own choice, for the average Parisian now prefers "mecanicien" to designate either the driver or his assistant, from which it is apparent that chauffeur will sooner or later be relegated to the limbo of forgotten terms.

LETTERS INTERESTING AND INSTRUCTIVE

The Necessity for Intelligent Valve Grinding.

Editor THE AUTOMOBILE:

[520.]—Will you please tell me through "Letters Interesting and Instructive" how to grind the valves of an automobile engine and how to know when such grinding is necessary? Is it not possible to make an engine with valves of a type that would not require grinding? I cannot understand why, if valves are properly fitted and the engine is kept working under proper conditions, it will be necessary at such frequent intervals to regrind the valves. Any light you can throw on this subject will be greatly appreciated.

City Island, N. Y. JOHN WILKINS.

Valves need grinding, because it is impossible to protect them from the wear that necessarily occurs on certain portions with all moving mechanisms. Even by the use of the best steels, it is impossible to provide a quality of material that will indefinitely resist the scoring action of the rapid flow of gases, together with the corrosive action due chiefly to their high temperature. Added to these is the chemical action of water or other minor components of the mixture, and the continuous hammering when the valves are in action. When the full force of these various destructive effects is realized it becomes a wonder not that valves wear out but that they last as long as they do. By careful designing most of the injury is made to occur at points capable of being readily resurfaced by the process of grinding. To grind a valve it is necessary to apply a small quantity of fine abrasive material between the valve and its seat, following this by rotating it with a screw-driver, brace, or any convenient means, until the faces in contact are bright and smooth. Almost any abrasive may be used, even sand from the roadside having been utilized in an emergency, but with the harder abrasive such as emery and carborundum it is very essential that all traces of the grinding material be removed after the work is completed, since otherwise they will cause wear in the cylinders. Some experts prefer to use ground glass, grindstone dust, and the like, because of this point. The need of grinding is indicated by lessened power, due to leakage of the gases through the valves; by unusual ease of cranking; by backfiring into the carbureter, and by the condition of the valves themselves, in respect to pitting, corrosion, and incrustation.

Carbonized Cylinders and Air Cooling.

Editor THE AUTOMOBILE:

[521.]—Is it a fact that the cylinders of an air-cooled engine carbonize inside at frequent intervals, so that they have to be removed and the pistons taken out to scrape away the carbon? Is this the real and serious objection to this type of motor? I am told that this is the case and would greatly value your opinion.

Barberton, Ohio. WILLIAM WALTERS.

With some types of air-cooled motors, not as well designed as they might be, there undoubtedly exists the tendency to which you refer. In such cases carbonizing occurs in a combination of the high temperature and the undue quantity of oil used, the surplus oil being burned imperfectly because of the lack of sufficient cooling means, with the result that it is deposited in the manner you mention. When such deposits reach a certain amount there is, of course, nothing for it but to take the engine down and give it a thorough cleaning. The necessity for this is generally indicated by the frequent occurrence of preignition, due to projecting points of red-hot carbon within the cylinder. With the best and most successful air-cooled motors of to-day no more oil is required than with a water-cooled car, and overheating is little, if any more, likely to occur, especially in the hands of a competent operator. It must be remembered that even with the best systems of water cooling it is possible, through careless operation or defects in design, to have carbonizing occur to a very serious extent. Carbonization of oil in cylinders, therefore, is something liable to occur in both water-cooled and air-cooled cars.

Anti-Freezing Solutions for Water-Cooled Cars.

Editor THE AUTOMOBILE:

[522.]—In the issue of "The Automobile" of December 6, I note a short article on non-freezing solutions for automobiles, in which the experience of readers was invited. I have made some experiments along this line, and gave the results to the local paper for the benefit of fellow autoists in the town. As the results in the form of data will, in all probability, be of value to owners of cars in other parts of the country, you may reprint them if you wish to do so. C. F. NIXON, Ph.G.

Leominster, Mass.

The fluids recommended are solutions of calcium chloride, glycerine and wood alcohol. I made a 10, 15, 20 and 25 per cent. solution of each of these and determined the freezing point of each, with the following result:

Calcium chloride—Ten per cent. solution freezes at 15 above zero F.

Calcium chloride—Fifteen per cent. solution freezes at 5 above zero F.

Calcium chloride—Twenty per cent. solution freezes at zero F.

Calcium chloride—Twenty-five per cent. solution did not freeze at zero.

Wood alcohol—Ten per cent. solution freezes at 15 above zero F.

Wood alcohol—Fifteen per cent. solution freezes at 5 above zero F.

Wood alcohol,—Twenty per cent. solution freezes at 2 above zero F.

Wood alcohol—Twenty-five per cent. solution freezes at zero.

Glycerine—Ten per cent. solution feeezes at 20 above zero F.

Glycerine—Fifteen per cent. solution freezes at 15 above zero F.

Glycerine—Twenty per cent. solution freezes at 8 above zero F.

Glycerine—Twenty-five per cent. solution freezes at 5 above zero F.

Zero Fahrenheit was the lowest point I could reach with my freezing mixture. This is, I believe, low enough for practical purposes, as these higher percentage solutions freeze mushy, and not solid. They would not, therefore, in my judgment, expand enough to burst the parts if they did freeze in the machine.

I have in my machine a mixture of one part each of wood alcohol and glycerine and two parts water. I do not believe that this will freeze above 10 below zero. As shown above, a 25 per-cent. solution of calcium chloride stands the lowest temperature, but is objectionable, as it is likely to corrode the parts with which it comes in contact. Wood alcohol will evaporate by the heat of the engine and more must be added at intervals. Both glycerine and wood alcohol are likely to soften rubber connections after a time, but this would be a small matter.

Some Questions Concerning Fuel and Ignition.

Editor THE AUTOMOBILE:

[523.]—Is there any advantage in the distance from the carbureter to engine? Will a carbureter give the same service with a long pipe to engine or bolted direct to cylinder? Which of the two patterns of installations would make the engine start easier? Should the float in a float-feed carbureter be set so the gasoline will stand up as high as possible without running over at the spraying nozzle, or slightly below the top of nozzle? Why is it that the air-valve springs in carbureters for single-cylinder engines are made large in diameter with but few coils, while for multiple-cylinder engines the air-valve springs are small with several coils? Will a carbureter made for a four-cylinder engine give satisfaction on a single-cylinder, both engines having the same size inlet pipe? How is the proper way to adjust a vibrator, and how do you tell when it is adjusted properly? A SUBSCRIBER.

Flemingsburg, Ky.

While there is some difference of opinion as to which of the two methods you describe really constitutes the better practice, a majority of designers seem to be in favor of getting the car-

bureter as close to the inlet valves as possible. With a long pipe, it is obvious that there must be a certain amount of attenuation of the air upon suction, with the result that the carbureter is not brought as instantaneously into operation as might be desirable. On this account the Renault people have even patented a system of feeding fuel by means of four carbureters—one for each cylinder. On the other hand, there is one school of engineers that insists upon a certain advantage supposed to be inherent in the long piping, it being claimed to act as a sort of reservoir for mixture, so that it is not necessary that the carbureter be brought instantly into action, there being enough fuel in the intake piping to provide several charges. On the 1907 six-cylinder Panhard cars a scheme of this sort is applied, it is said, with good results. There are so many factors concerned in the starting of an engine that it is difficult to give a conclusive answer to your third question. If the engine had not been stopped long the mixture contained in the long intake piping might cause it to start very easily; while if the motor had stood for some time it would seem that the carbureter close up would be the idea. A float-feed carbureter should be so set that the gasoline will stand about a sixteenth of an inch below the top of the atomizing nozzle. This will require that the level maintained in the float chamber be fully a quarter of an inch lower still, because of the capillary attraction in the small bore of the nozzle. Even with the fuel very low, however, it is surprising how the suction of the engine will draw it out. We do not think that it is a fact that air-valve springs vary in the way you state, except in isolated instances. A small diameter-spring, with several coils, however, is likely to act more quickly than the other kind, which might be of advantage with the more steady work entailed in feeding four cylinders. A carbureter suitable for a single cylinder of given size should feed four cylinders of the same size equally well. The reason of this is that four cylinders do not overlap in their demand on the carbureter, but require fuel one after another. They thus keep the carbureter working more constantly, but do not make any greater demand upon it than a single cylinder. The adjustment of vibrators is difficult to explain without taking up considerable space, and can be learned most effectively by experimenting until a good, hot spark is obtained between the plug terminals under normal working conditions. The sound is less of a guide than is commonly supposed. A good deal of information on this subject was given in THE AUTOMOBILE, issue of November 15, 1906, in answer to question No. 467.

Another "Hardy Annual" Crops Up Again.

Editor THE AUTOMOBILE:

[524.]—I have an argument on hand at present, and it is one that you have probably had before you more than once in the past. A claims that an automobile going round a curve at a very high rate of speed, such as on a track, for instance, will upset toward the inside of the track. I hold, that if it turns over, it will go in the opposite direction, and base my claim not alone on theory, but on experience. Any moving object which, when going in a certain direction represented by a straight line, is suddenly turned from its course, tends to continue in the original direction, and centrifugal force, in the case of a car, will cause it to turn over outwardly or away from the track fence. I am certain that your explanation will not only settle the argument in my favor, but will also make the matter clear to many another.

Bronx, N. Y. City. JAMES REUTERSHAN, JR.

This is, indeed, one of the hardy annuals in the way of questions on an elementary principle of mechanics; no matter how often it is answered it continues to crop up again and again, and usually in about the same form. Automobile racing in particular has served to give it a new lease of life. Of course you are right. It would be about as erroneous to state that a blazing pinwheel throws its fire toward its center or hub, when revolving at a high speed, as to say that an automobile tends to overturn inward when rounding a turn at sixty or seventy miles an hour. From one cause or another, automobiles have upset toward the infield of the track during the course of a race, due to colliding with an obstruction, defective steering gear, or something of the kind, and probably this has given rise to the general assumption in question. When a body traveling in a straight line at high speed changes its course two forces come into conflict—gravity and centrifugal force. If the speed of the object be so great, and the radius of the curve so short that centrifugal force overcomes the attraction of gravity, the object will leave the ground and tend to fly in the direction it was originally traveling. In the case of a car the inside wheels would leave the ground and the car somersault sideways toward the outside of the track. This has been illustrated in automobile accidents time and again, such as that on the Florida beach two years ago. It is in order that the attraction of gravity may always be superior to centrifugal force that railroad curves and race tracks are banked. This shifts the center of gravity to the inside wheels of the car and prevents it from overturning outwardly, as would be the case were a curve taken at high speed on the flat.

Peculiar and Unusual Fan Trouble.

Editor THE AUTOMOBILE:

[525.]—I have a small four-cylinder water-cooled car, the cylinders of which are commencing to show a great tendency to become overheated. The radiator is the usual honeycomb pattern, with fan behind it, and the cooling system holds five gallons of water. Whenever the car is run hard for a short time, the water boils and overflows, while the cylinders get so hot that I am afraid of the pistons scoring them, through injury to the lubricant. I can find no obstruction in the cooling system, and the water seems to circulate freely, the pump being apparently in good order.

Altoona, Pa. ALFRED JADWIN.

Unless there is some obstruction or deposit in the waterjackets, so located as to prevent the free circulation of the water to other portions of the cooling system, it would seem probable that there is something wrong with the air blast through the radiator. Of course, heating may occur with a great many cars if the engine is run hard for long periods, with the car standing still but if this is not your trouble, and the trouble has come on simply in the course of ordinary use, it cannot be thus easily explained. We have known of cases in which the fan blades became bent, and by running too nearly flat failed to set up the blast required, despite their rapid rotation and the fact that everything else appeared to be in perfect order. A thorough investigation along some or all of the lines suggested should disclose the difficulty. Pay particular attention to the condition of the fan, as suggested, especially if it be of the type in which the blades are not shrouded together by some sort of peripheral member.

WHY MR. HOTCHKIN COULDN'T DEMONSTRATE.

Editor THE AUTOMOBILE:

[526.]—It is with pleasure that I inform you of the conviction of Willie Parker and Harry Stein, who stole my 1906 Packard demonstrating car from in front of the First Regiment Armory, on the opening night of the Auto Parts Show, September 22, 1906. They were sentenced December 19 to one year's term in the county jail, each. They have already been in jail about three months, awaiting trial. This makes the jail term about fifteen months for them. Parker comes of a good family, his father being an ex-vice president of the Chicago Board of Trade. He has been in several scrapes before. Harry Stein is now wanted by the New York City police for theft of automobile parts. It is more than likely that these boys would have been released with a reprimand had I not instructed my attorney to proceed against them. They are members of a gang of automobile thieves and are both implicated in the theft of Messrs. Gardner, Fairbanks, and Cordner's machines, from this city. They also have confessed to the theft of several other machines, and it was high time that a check was put on this kind of business.

With my own machine, they ran, as near as I can find out, in three days, about 700 miles, and succeeded in wrecking it to such an extent that it cost me in the neighborhood of $300 to have it repaired. Visitors at the Parts Show thought it was a bluff on my part, when I announced that I could not make demonstrations on account of the theft of my demonstrating car.

Trusting that this may be of some service to you as a news item, and that you will be kind enough to straighten up the matter set forth in the last paragraph, I am, P. M. HOTCHKIN.

Chicago, Ill.

(Continued from pages 911-914, THE AUTOMOBILE, December 27.)

THE milestones bordering the French roads, or rather the *bornes kilometriques*, are exceedingly well placed, legible, and accurate. They mark the distance, on the great trunk roads leading out from Paris, from the capital to the other termini, "Routes Nationales" Nos. 10 and 12 Paris—Brest, via Versailles, Alençon, and Rennes; "Routes Nationales" Nos. 13 and 172, Paris-Coutances, and the Route de Nantes, via Versailles, Chartres and Le Mans.

Besides showing the kilometerage, they note also the class of route, its official number and, when a stone is on a boundary between one département and another, their respective names. On the minor roads this information is no less clear and explicit, but the distances are usually reckoned as from one *chef-lieu* (county town) to another.

One Can't Go Astray in France.

if he knows the plan and procedure on which these kilometer stones have been laid down; and if he travels along a navigable river, in the now facile and popular canot-automobile, he will find the river bank marked off in the same way, except there is a little white stone each hundred meters (ten to a kilometer). This is that you may not be over charged if you have recourse to a towboat. You pay for *rémorquage* (towing) by the kilometer, hence some sort of official reckoning was made necessary. France is paternal all the way through, and she does not neglect the roads and their users, or *les chemins qui marchant*, as Pascal called the great rivers.

The other road markings in France are even more thorough and detailed than the kilometer stones, though the distances as given by the two classes of markings do not always correspond. It depends upon whether the distance is reckoned from the center of the *ville* or the edge or boundary of the *commune*, and again as to whether a road has recently been straightened or not. This accounts for the occasional discrepancies between the little blue painted, cast iron signs which are at every cross roads and the figures given by the kilometer stones themselves—this, and the fact that often, since the kilometer stones were first planted, a road has been straightened here and there and a kilometer has been saved in the distance.

All these are governmental affairs. Then come the most excellent road markings of three private organizations: the Automobile Club de France, the Association Générale Automobile, and

The Omnific Touring Club de France.

which, with more than a hundred thousand members and the President of the Republic as its patron, is doing a wonderful work in all things appertaining to "le tourisme" in France, whether one travels by road or rail, by an automobile boat on the water, or a land automobile, or for that matter, by balloon or aeroplane.

The Touring Club de France is plentifully besprinkling all the main roads with great painted signs giving the terminus of the route, the town through which one is passing momentarily (Good idea, this!), and the next town or city in either direction, with their proper distances, all marked in great staring letters at least four inches high, so that one may read literally as he runs—and this, be it remembered, is what the automobilist likes. As the new locomotion makes headway in France all things apparently strive to keep pace with it. This, more than all else, accounts for the supremacy of France in automobilism to date.

Coupled with the above mentioned excellently planned and placed signs, are still others denoting that an important town lies a certain distance just off the main road, or that a natural curiosity, a fine viewpoint, a cascade, a chateau, or a Roman ruin are but a half a kilometer away.

All this makes for enjoyable travel by road, and gives the stranger the benefit of an intimate acquaintance with the land so far as his finding his way about goes. One must know how to read all these signs, and where to look for them, and be possessed of a nose for topography, as the French have it, nevertheless.

The Association Générale Automobile.

goes farther and marks danger spots in a striking and efficacious manner by a series of staring black and white painted iron plaques, with no wording thereon, but with a series of cabalistic signs which even a Digger Indian or a Sioux could understand without being told. I understand the Vanderbilt cup commission used these signs on the Long Island cup course and that they proved highly satisfactory.

A simply drawn or silhouetted gateway means that a level railway crossing will be met with soon; an archway with a passage beneath, that the road passes beneath a railway; and a sort of great inverted U indicates a culvert or *canivau* across the road (most welcome, this!). Finally there is a little nondescript thing, like the hump on a Bactrian dromedary, which indicates the nearby presence of a *thank you, ma'am*, known in France as a *dos d'ane*, or donkey's back.

There Are Other Signs.

and signals that the traveler on the roads in France meets with once and again, and is glad he does. One is a white lettered sign on a blue ground stating that a half a kilometer farther on

CHEMIN DE GRAND COMMUNICATION.

ROUTE NATIONALE AT THE COTE DE GAILLON.

ROUTE DEPARTMENTAL IN NORMAND

the route is in *en course de réchargement*, meaning that there is road repairing going on; this is well to know before you come suddenly upon it. A similar sign announces that a steam roller is at work; this, presumably, is for the benefit of horse-drawn traffic.

There is another class of signs—and this is all—those put at either end of a straggling village or town restricting the speed of automobilists to twelve, ten, eight, or even six kilometers an hour while passing through—the speed that the local *maire*, who most likely is a *bon bourgeois*, or even a peasant farmer, who never rode in an automobile in his life, thinks is proper. Sometimes one is held down to *au pas* (a walking pace), and whenever one meets with one of these warnings he had best take it to heart, for the local authorities can be very severe when they like, even in France. It is all well meaning and well done in many cases, for a narrow, twisting cobblestoned main street in an unknown French town has untold horrors for a stranger automobilist, even if he is adept.

ROMAN MILESTONE IN PROVENCE.

Road obstructions are not unknown in France, but the law is very strict against one's taking up more than his proper share of the road. If you overtake a slow-going vehicle it must make way for you and let you pass. Even with the peasant road user this is not mere idle theory or an unused law, as it frequently is in England, where a motorphobe will often not get out of your way, even if you threaten to have the law on him.

The law is summary in France, with contravention against the rule of the road, as with other minor offenses, though it is true that bureaucracy ofttimes clogs the wheels. Once when

We Had Been Struck by a Market Wagon,

which tore our front mud guard off its supports, we were interrogated by a couple of anxious-to-please gendarmes, who were equally anxious to make a *procès verbale* against a poor, well-meaning Norman *paysanne* who was driving her cart to market loaded with butter, eggs, and fowls, to say nothing of a bleating calf. She meant no harm, and the damage was really slight, and we were not in the least vindictive. In spite of this, the action of the gendarmes showed at any rate they bore known no illwill against *les étrangers* and didn't suggest for a moment that the case might be turned against us. How different! Oh how different, might have been the case in England!

The two gendarmes simply sprang up from nowhere—they were not in sight previous to the *tamponnement*—and they simply filled their notebooks with pros and cons that they might have something to show their brigadier as a result of their morning's work. The old lady was, as natural, scared half out of her wits and we ourselves—this being the first experience of the kind in some years of automobile travel—were something more than curious, perhaps even excited. The only cool persons, in fact, were the two gendarmes of the nationality which is usually accounted the most excitable of all races, unless it be the evil-eyed Sicilian.

The interrogatory of the old lady being finished, the gendarmes turned to us —we were four, the author, the artist, and two in the tonneau.

Our *papiers* were demanded, produced, and found in order. (The first thing an automobilist is asked for by an "agent" or a "gendarme" in France is his *papiers*. Verb sap: Have them always handy.) Our addresses were then noted, and then the driver was asked his age, birthplace, and—of all things—*"Quel est le nom de votre mere?"* Why this, we expostulated? "It is for your good," said the brace of courteous gendarmes in chorus.

Was there ever a law so completely polite in its procedure! All was given that was asked for, and all of us went on our ways rejoicing; the old woman thankful that she had not been called upon to pay up; the gendarmes grateful for something to break into their monotonous existence; and ourselves that we might take to the road again and make up for lost time.

The French Peasant Knows the Law

very well, and observes it, though he may have a natural resentment for the dust you throw up in passing. This is human nature. Everyone keeps to their right as a matter of course, and everybody in France is exceedingly careful in taking corners —all but the drivers of butchers' and bakers' carts in suburban Paris, who are the same as their reckless brethren everywhere else.

Stray cattle, and even dogs, have no rights on the roads, and if you bowl one over there's no damage to be paid for by you if you were not otherwise reckless, and you even have a redress against the proprietors of the beasts if they have caused you damage. In some parts grazing cows by the roadside are invariably held by a cord. This is the case in Normandy, but in Brittany they always have a guardian with them, an incompetent little Breton peasant maid in sabots and *coiffe*, who loses her head immediately you heave in sight, and deserts her charges, leaving them to your tender mercies, which are, of course, gracious and gallant. One could not take advantage of one of these winsome and theatrical looking little samples of Breton femininity.

Speaking of Britanny Suggests

that it is there that one meets a most unusual puncture fiend in the shape of sabot nails. They have a way of dropping out of the wooden shoes affected by all classes in the Breton countryside, and resting point uppermost all over the ground. So numerous are they that one has only to scratch the earth, anywhere between Nantes and Quimper and Mayenne and Brest, to gather a handful of these exceedingly vicious hobnails. There's only one remedy, and that is good heavy tires that they won't puncture; then every night you simply run your hand over their peripheries and pull out a half dozen, a dozen, or twenty of these sharp pointed, big headed nails—that's all.

Just for the Sake of Comparison

it is interesting to stop and consider what travel in France was a hundred years ago, particularly for the foreigner, usually the Englishman, who came over the same road that De Warde and Buckingham took in the time of Louis XVI. A hundred years ago it cost nearly five pounds sterling, which is not greatly more than it does today, and the journey was first made by coach from London to Dover, and then by a cranky little shallop across the Channel to Calais.

Next morning the Paris coach left en route for its final stopping place in the French capital. The average speed was four miles per hour and 54 hours were consumed in this part of the journey.

SOME OF THE ROAD SIGNS OE THE TOURING CLUB OF FRANCE.

CLUBS START NEW YEAR WITH SOMETHING DOING

Massachusetts Automobile Association Transacts Business.

BOSTON, Dec. 31.—The board of directors of the Massachusetts Automobile Association held a meeting recently at which plans were discussed for the management of the association under the new rules of the American Automobile Association. According to the new rules Massachusetts will be entitled to four representatives on the board of directors of the A. A. A., and it is expected that the State association will become of much more consequence than has been the case heretofore. The directors decided, in view of the increased work that will fall to the officers of the association, to divide the office of secretary-treasurer, and James Fortescue, secretary of the Bay State Automobile Association, was elected secretary, and J. C. Kerrison treasurer. The directors have nominated as representatives of the Massachusetts association on the board of officers of the A. A. A. President Elliot C. Lee, of the Massachusetts Automobile Club; President Lewis R. Speare, of the Bay State Automobile Association; President John P. Coughlin, of the Worcester Automobile Club, and President J. L. Haynes, of the Springfield Automobile Club. The Massachusetts association has over 1,600 members, and now has six representatives on the A. A. A. board. A campaign will be made in this State to secure individual memberships in the A. A. A. as well as the customary club memberships.

Quaker City Motor Club Adopts Constitution.

PHILADELPHIA, Dec. 31.—Over 150 of the 235 members of the Quaker City Motor Club attended last Thursday night's meeting at the club's new quarters in the Hotel Majestic, when the constitution and by-laws, after a three-hours' revamping, were finally adopted. The nominating committee submitted a long list of candidates for permanent officers, the names of some of the best-known men in local, professional, and business circles being included. The election is scheduled to take place at the next monthly meeting. Formal application was made to-day under the laws of Pennsylvania for the incorporation of the club. The club is making active preparations for a big campaign of endurance runs, race meets, hill climbs and parades during the incoming year of 1907. The endurance run to Harrisburg on New Year's Day is the initial one on the schedule.

Inter-City Bowling by Massachusetts Automobilists.

WORCESTER, MASS., Dec. 31.—Representatives of the Worcester Automobile Club and of the Bay State Automobile Association of Boston met to-day and arranged for a series of bowling matches to be held this winter between representative teams of each organization. The first match will be in Boston January 24 and the next in this city on January 31. The matches will be held every week, alternating between the Hub and the Heart of the Commonwealth. Both clubs will contribute a silver trophy, to be chosen later, which will be awarded to the winning team. Mr. Weltman will captain the Worcester team. He says some of the members need exercise and will get it before the advent of the spring season.

Automobile Club of Buffalo Elects New Officers.

BUFFALO, N. Y., Dec. 31.—At the annual election of the Automobile Club of Buffalo the following board of officers was elected for the current year: President, Seymour P. White; vice-president, Frank B. Homer; secretary, D. H. Lewis; treasurer, D. M. Satterfield; board of directors, the above-mentioned officers and E. R. Thomas and Charles Clifton. The retiring president, H. A. Meldrum, was presented with a beautifully-designed loving cup, and W. H. Hotchkiss made an address on new legislation pertaining to the use of automobiles.

Automobile Club of America Moves Its Executive Offices.

NEW YORK, Jan. 1.—The executive offices of the Automobile Club of America were removed on Monday, December 31, to the new clubhouse on Fifty-fourth street, west of Broadway, where in the future all of the business pertaining to the club will be transacted. The new building will not be open for the use of members until its final completion, of which due notice will be given. Jefferson M. Seligman has been appointed chairman of the club's sign-post committee, and touring members who may note the desirability or necessity of placing directing signs on the road in various localities are requested to communicate with Chairman Seligman.

A committee on public safety, consisting of the four ex-presidents of the club—Winthrop E. Scarritt, chairman; George F. Chamberlin, Albert R. Shattuck, and Dave H. Morris—was appointed by the board of governors at its meeting December 28. The committee will consider ways and means whereby the club may better use its power and influence toward correcting certain evils which have grown apace in connection with the evolution of the sport and industry, and will act with the law committee in recommending to the legislature such changes and amendments as may seem necessary for the better protection of all users of the highways, and take a determined stand against speed madness by the reckless owner or the inconsiderate dare-devil chauffeur. An address on the purposes and aims of the committee will soon be issued.

Bay State Automobile Association Has a Christmas Tree.

BOSTON, Dec. 31.—The annual meeting for the election of officers of the Bay State Automobile Association and for such other business as may come before the meeting, will be held on Monday, January 7, at the clubhouse, 282 Dartmouth street. During the year the club has occupied its new clubhouse and has gained materially in membership. It has been very active in all lines, among its events being the spring race meeting at Readville track, the tour to the White Mountains in the summer, and the gymkhana games this fall, besides several short tours to Rye Beach and other places. A new feature of the association's activity established during the year has been the dining service at the clubhouse. This has been well patronized by the members and is a pleasant part of the club's life. The club is to celebrate New Year's as usual, but instead of a run to some place at a distance, as has been the custom, the celebration will take place at the clubhouse and will include a dinner and entertainment. Saturday evening there was a Christmas tree with appropriate gifts to all who were present. Secretary James Fortescue was remembered by Santa Claus in a substantial manner.

Long Island Automobile Club Selects Committees.

BROOKLYN, N. Y., Dec. 31.—The regular monthly meeting of the Long Island Automobile Club was held last Wednesday evening at the Cumberland street clubhouse. Some slight amendments to the by-laws were adopted and standing committees for the coming year were selected. Dr. A. C. Howe heads the garage committee as chairman. The house and entertainment committees have been combined under one head, and the chairman is Frank G. Webb. L. T. Wise again heads the technical committee. The membership of the club numbers 400.

Rhode Island A. C. Elects Officers on January 9.

PROVIDENCE, R. I., Dec. 31.—The annual meeting and banquet of the Rhode Island Automobile Club will be held at the Garnet street clubhouse on the evening of January 9. E. A. Rusden, a well-known member of the club, sails on January 8 for a trip around the world, part of which will be by automobile.

THE AUTOMOBILE

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Progress of the Self-Starting Device. One of the first drawbacks encountered when the internal combustion engine had passed the limit of small units readily started by hand, was the problem of getting it under way. The means employed during the fifteen or twenty years that engines sufficiently large to require it have been built, have been numerous and diverse, though long before the end of that period they had reached a common basis in the majority of instances. Some of the earliest took the form of ordinary black powder cartridges, fired by pulling a lanyard as was done on old-time guns, while others were merely small motors of the same type, which were started by hand and their power utilized to turn over the larger engine until it took up its own cycle of operation. Still another that is in use to-day on comparatively small motors consists of a hand-pump by means of which an explosive mixture may be forced into the cylinder under compression.

The latter also dates back a number of years, and it has come to be the commonly accepted type, except that the engine itself is depended upon to generate the compression and air alone under pressure is stored in a tank. This is utilized either by direct admission, operating the motor as a single-acting air-engine until it takes up its cycle, or through the medium of a small compressed-air motor. In view of the general acceptation that this manner of starting large power-units has met, it seems more than strange that there should have been any hesitation in its adoption on the automobile. That the ability to start the motor from the seat has long constituted something greatly to be desired goes without saying, but that there has been, during the past few years, a somewhat inexplicable groping further afield, resulting in more or less abortive complication, is likewise true. It has been responsible for the numerous devices that have come and gone without the car being any the better as the result of their invention. A self-starting device to be successful must, above all, be simple and easily controlled, and, barring the use of a lever at the seat, which is merely the handcrank in another place, compressed air seems to fulfill these requirements better than anything that has been tried thus far.

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Influence of the Automobile on Motor Design. It has been well said that the changed requirements of automobile service have brought about the evolution of a motor that differs almost as much from its predecessor, the internal combustion motor of the stationary type, as the latter does from the steam engine. But a comparatively few years ago the prediction that such a motor, as is now in common use on the automobile, could be produced, would have been ridiculed. Including its bedplate, a modern gasoline engine of the stationary type rated at but 6 horsepower, weighs from 1,100 to 1,500 pounds. Assuming that the bedplate accounts for at least 50 per cent. of this, it may still be said that engines of this type will average close to 100 pounds per horsepower. It is evident that not alone this, but half of it, would be an excessive unit of weight per horsepower for the automobile, and though, ten years ago, the stationary engine designer would have ridiculed a motor that weighed not more than 10 to 12 pounds per horsepower, as nothing more substantial than an inventor's dream, this has come to pass and a still greater reduction is being sought for.

A new influence is at work to make a motor in which the weight bears an even more remarkable ratio to the power output, not only a possibility but a practical reality. This is the demand for a motor suited to the requirements of aerial navigation. In brief, these are merely that the motor shall produce the greatest power with the least weight, and though in passing through the throes of invention such as assailed the automobile builder several years ago, designers of aerial motors have brought forth some truly wondrous creations, they have also achieved some very remarkable results. Every expedient known to the designer has been resorted to in order to increase the power and reduce the weight, and such figures as three or four pounds to the horsepower have been attained. This naturally represents a standard considerably below the safe practical limits—in fact, it has not been found practical to design a motor having less than six pounds per horsepower. But whether above or below this limit, the chief stumbling block that the designer of motors for aerial purposes has had to contend with is the factor of reliability. It has been found possible to build motors of these seemingly impossible weights and motors that would run—but their operation has been fitful and uncertain. Still there appears to be no reason to doubt that eventually success will reward efforts in this direction as it has in the case of the automobile.

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Is Revenue the Sole Object of Auto Laws? Legislation that will bring about perfect regulation of any activity, that will be just and, above all, that will equitably affect the interests of all concerned, can never be enacted at the behest of any one branch of the community. The radical would banish the automobile from the highway totally; his less prejudiced coworker would permit its continued existence under practically prohibitive restrictions and so down through varying degrees of severity. The New Jersey statute, which is being hailed as a success by its advocates after six months' trial, is a typical instance of the result of legislation enacted to benefit one section of the community at the expense of another. In its formulation, both equity and comity were equally ignored and its alleged success consists largely, if not entirely, in its efficacy as a revenue producer. Of the fact that its instigators have succeeded in mulcting the same number of autoists of a larger sum than ever before, there can be no doubt, but a long step backward was taken where equitable legislation on the subject is concerned.

WYCKOFF, CHURCH & PARTRIDGE DINNER.

A notable galaxy of automobile stars sat at the speaker's table at the annual dinner of Wyckoff, Church & Partridge, held on the evening of December 27, at Reisenweber's, New York City. It has been the yearly custom of this up-to-date concern to have a dinner, and this time the intent was to make it of a character representative of the entire industry, and the effort was unquestionably successful. Job E. Hedges, the legal luminary of the American Motor Car Manufacturers' Association; Charles T. Terry, counsel for the National Association of Automobile Manufacturers; M. I. Brock, associate manager of the Association of Licensed Automobile Manufacturers; Senator Martin Saxe, well known in automobile legislation; Senator Slater; A. R. Pardington, manager of the Long Island Motor Parkway; S. M. Butler, secretary of the Automobile Club of America; Dr. F. A. Cook, a noted Arctic explorer, whose next effort will be to the South Pole, and the Rev. Arthur Whittenham, of Oxford, were those who supplied speeches, humorous, interesting and instructive. After C. F. Wyckoff had made a well-worded address of welcome, he turned the oratorical feature over to Toastmaster Thomas F. Moore.

Mr. Hedges, among other things, stated that the sentiment against automobiles as such is dying out. Senator Saxe commented that judges were needed rather than additional legislation for the enforcement of the present laws. Mr. Terry predicted that some day the only legislation necessary will be such as to provide for complete identity of machines and the exercise of due caution in the use of the highways. Over a hundred were present at the function.

AUTOMOBILE MAIL SERVICE FOR MILWAUKEE.

Postmaster Owen, of Milwaukee, has let it be known that on and after February 1, 1907, the "beer city's" mail is to be collected with the aid of automobiles. Three machines have been ordered for the service and it is confidently expected that they will be ready to go into commission on that date. The city has been divided into districts so that both the business and the outlying districts will be better served than by the old methods.

FOUR MILES MORE FOR THE PARKWAY.

Though it is reported that some of the landowners along the route of the proposed Long Island Motor Parkway are holding out for big prices, this is not the case generally by any means. A. R. Pardington, the manager of the Parkway, is just in receipt of the following letter from W. H. Jones, chairman of the board of supervisors of Nassau county, which speaks for itself:

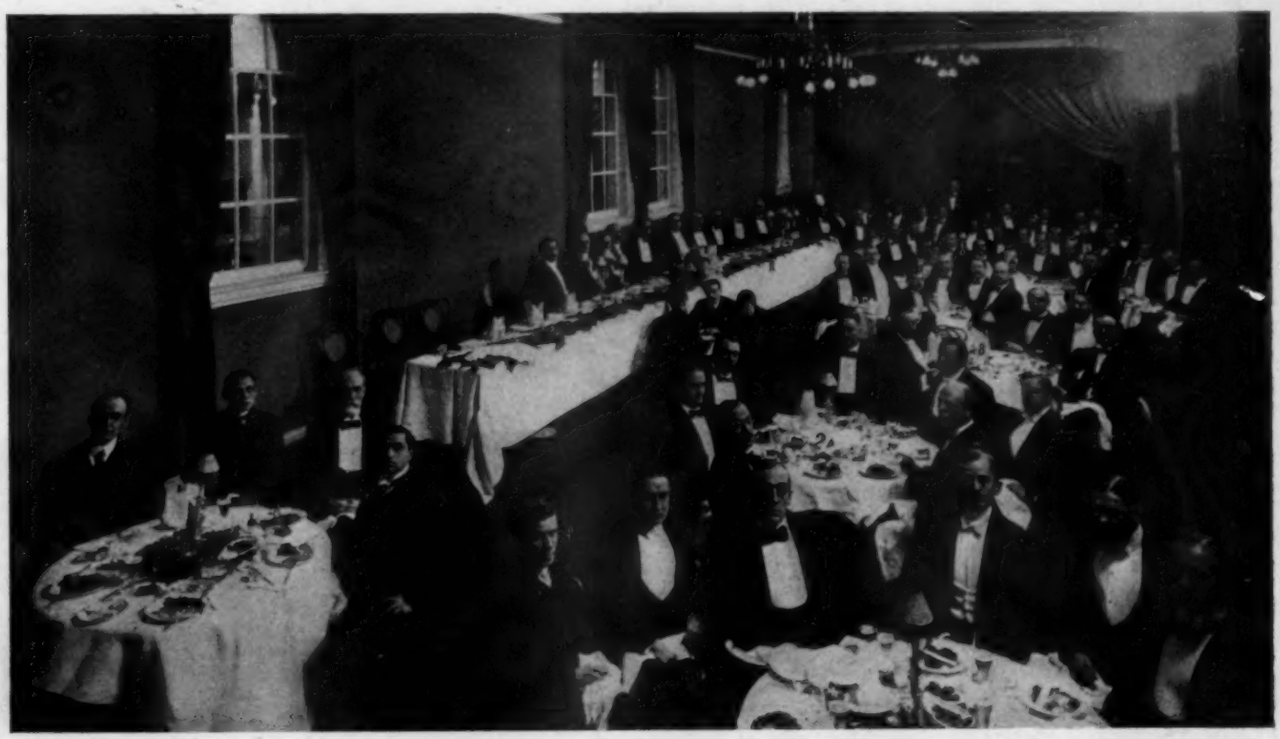
"I have authority to offer you about four miles of right of way east of Hicksville, through lands which I own and two of my neighbors. One of my neighbors is, at the present time, in Paris. I wrote to her some time ago and she has authorized me to offer this to the Parkway company. I have taken up the matter with some of our people who own property nearby, and all of them will, I think, donate the necessary right of way. I have other parties who are interesting themselves and will probably report to you very shortly."

AN INTERESTING DECISION IN TANK CASE.

After hearing arguments on the petition of the Avery Portable Lighting Company, to restrain the Commercial Acetylene Company, Indianapolis, Ind., who are plaintiffs in the patent infringement action brought against the former concern in July last, from continuing to institute actions against buyers of the Avery apparatus, Judge Quarles, sitting in the U. S. Circuit Court ot Milwaukee, Wis., rendered a decision prohibiting the plaintiff from bringing further suits against the customers of the Avery company until the validity of the patent had been passed upon.

WORK BEGUN ON MAXWELL-BRISCOE PLANT.

NEWCASTLE, IND., Dec. 29.—Work on the foundation of the new plant of the Maxwell-Briscoe Company is already under way here, the contract, which was formally awarded a few days ago, calling for the completion of the foundation within 60 days from date. It was let to Gubbins & Garvey, a local firm, and involves a total of about 1,200 cubic yards of concrete construction. Bidding for the work was brisk, a number of outside firms also submitting estimates.



HOW THE DINERS LOOKED WHEN CAUGHT BY THE CAMERA AT THE WYCKOFF, CHURCH & PARTRIDGE ANNUAL SPREAD.

SELDEN COMPANY BEGINS BUSINESS.

ROCHESTER, Dec. 31.—The Selden Motor Vehicle Company, which was incorporated December 24 with $500,000 capital, called the first meeting of its stockholders late last week. The principal business of the meeting was the election of officers, those chosen being George B. Selden, president; L. A. Fischer and J. M. Walmsley, vice-presidents; Gilbert E. Mosher, treasurer, and R. H. Salmons, secretary. With the exception of L. A. Fischer, who hails from Buffalo, all of the officers are residents of Rochester. The directorate of the company will be composed of the above mentioned officers, besides George E. Foster, of the Foster-Armstrong Company, Frank A. Russell, of Rochester, and A. Snyder and A. G. Bartholomew, of Buffalo. Mr. Russell will be superintendent of the factory.

The manufacturing plant of the company will be at East Rochester, N. Y., where operations have already commenced for the erection of buildings covering over eight acres of ground. E. T. Birdsell, formerly connected with the Napier Company abroad, and who has been with the Decauville interests since coming to this country, will be the company's designer, and it said that he has been at work on the plans of a car for some time past in New York. He will continue the work from now on in the temporary offices opened in the German Insurance Building in Rochester. It is planned to place but a single model on the market during the coming year, though the company will also build a runabout later on. This first model will be a touring car listing in the neighborhood of $4,500 to $5,000, and no efforts will be spared to make of it as high-grade a vehicle as can possibly be turned out. Commercial vehicles will also be added to the factory's output in the course of time. The first car of the touring type to which the company expects to confine itself during the coming season is expected to be ready about June 1.

A license has been granted the company by the Association of Licensed Automobile Manufacturers, controlling the Selden patent, though for a time the spectacle was presented of an inventor unable to manufacture under his own patent. This arose out of the rule of the association that no license shall be granted until the applicant therefor has demonstrated its ability to manufacture automobiles of the standard required and has actually sold some of them. The license was first applied for a year ago, when the company was being promoted, but was then refused owing to inability to comply with these requirements. The license acquired was that formerly held by the Buffalo Gasoline Motor Co.

Though no details of the car to be built have been made public, it is said that its chief characteristic, so far as the motor is concerned, is that it will be equipped with a device providing an absolute safeguard against backfiring. This is the invention of George B. Selden, Jr. It seems that there have been numerous accidents from this cause in Rochester, one of them having ended fatally, which led to the invention of the device in question.

HYATT FIFTH "ANNUAL" AT THE WALDORF.

In anticipation of its "Fifth Frictionless Feast," which will be held during show week, January 12-19, or to be more exact, on Wednesday, January 16, in the Astor Gallery at the Waldorf-Astoria, Peter Severin Steenstrup, of the Hyatt Roller Bearing Company, who is chairman of the "Feast" committee, has sent out a neat little pamphlet recalling to mind the "Hyatt Idea" and abjuring the recipients to forego other engagements on that evening. Instead of the usual formal gorging with the prepared-in-advance "extemporaneous" speeches as a windup, there will be a continuous service of refreshments, solids and otherwise, from 9.30 P.M. to midnight, helped down by a continuous performance from 10 P.M. to 1 A.M.

Director Willy Tischbein of the Continental Caoutchouc & Rubber Company, Hanover, has received the Order of the Crown Class IV, from the German Emperor.

THE INCREASING GARAGE LIST.

The "Hub" to Have Another Motor Mart.

The New England Electric Cab Company, which now has its headquarters at the Park Square automobile station, is preparing to give Boston another mammoth garage somewhat similar in plan to the now well-known Motor Mart on Columbus avenue. Preparations have been made so quietly that the building was already in the course of construction before anything concerning it became public. It is situated in the Back Bay district, on Huntington avenue, directly adjoining Chickering hall. When completed this new garage will have three stories and basement, each containing 10,000 square feet of floor space. The basement will contain the washing department and machine shop, while a second set of washing machines will be installed on the first floor. Executive offices and chauffeurs' rooms will occupy the second floor, and storage for cars the third. The entrance will be in the center of the building and will be flanked by two large salesrooms. The enterprise is to be known as the Back Bay Motordrome, and will be under the management of W. H. Taylor, who was with the Park Square station for four years.

Copley Square Garage is Boston's Latest.

Boston is to have another motor mart, to be called the Copley Square Garage, and it is to be erected on the site of the old studio building on Irvington street, in the Back Bay, near Mechanics building. Work has already begun in clearing away the old structure to make way for the new garage. It is intended by the builders to make this a combination garage, sales headquarters and clubhouse. Suitable quarters for salesrooms are lacking in this city and as each new firm arrives on the scene it has increasing difficulty in finding a good site for a salesroom. It may be that the Copley Square garage will become headquarters for the unlicensed dealers. Negotiations have been made in an unofficial way looking toward the use of a part of the garage by the Bay State Automobile Association. The association is very well satisfied where it is, however, and as it has a long lease on its present clubhouse would probably decline to move, unless it would be materially benefited.

Detroit's Latest Modern Garage.

Although Detroit boasts of an automobile "row," the same as other cities, the garage business is not confined to it. Beyster & Thorpe, a partnership recently organized with $25,000 capital to do a garage business, has erected a garage and salesroom way out in the best part of Detroit's residential district, 1329-1331 Woodward avenue, only a few blocks from the fifteen-mile Grand Boulevard. The building has a fifty-foot front, most of which is of plate glass, and has a depth of 100 feet. Every facility for the rapid and convenient handling of cars has been provided, the plan of the building being modern in every detail. The selling end will be confined to representing the Aerocar, and a large electric sign of the latter will be placed across the entire front of the garage later. The front and main entrance is shown in the illustration.

MAIN ENTRANCE BEYSTER & THORPE GARAGE, DETROIT.

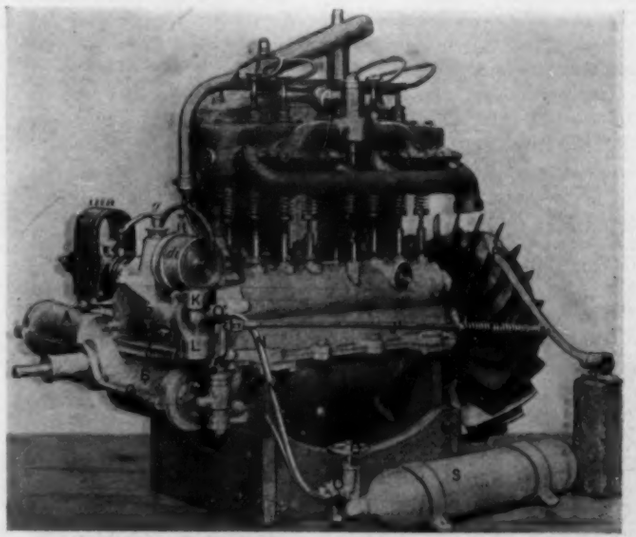
COMPRESSED AIR FOR SELF-STARTING DEVICES

By CHARLES B. HAYWARD

EVER since the automobile reached a stage of development where its designer was at liberty to feel that the chief question of moment had ceased to be "will it run?" the necessity of some simple device to enable the driver to start the motor from the seat has made itself more and more apparent. Whether considered casually or closely investigated at close range, the problem is not one that should hold any particular difficulty. Power must be applied to turn the motor over until it takes up its own cycle, and this power may take any form that the designer considers simplest and most adaptable to the purpose. The only other essentials are that it shall be easily controlled from the seat and readily detachable from the motor shaft when the latter starts.

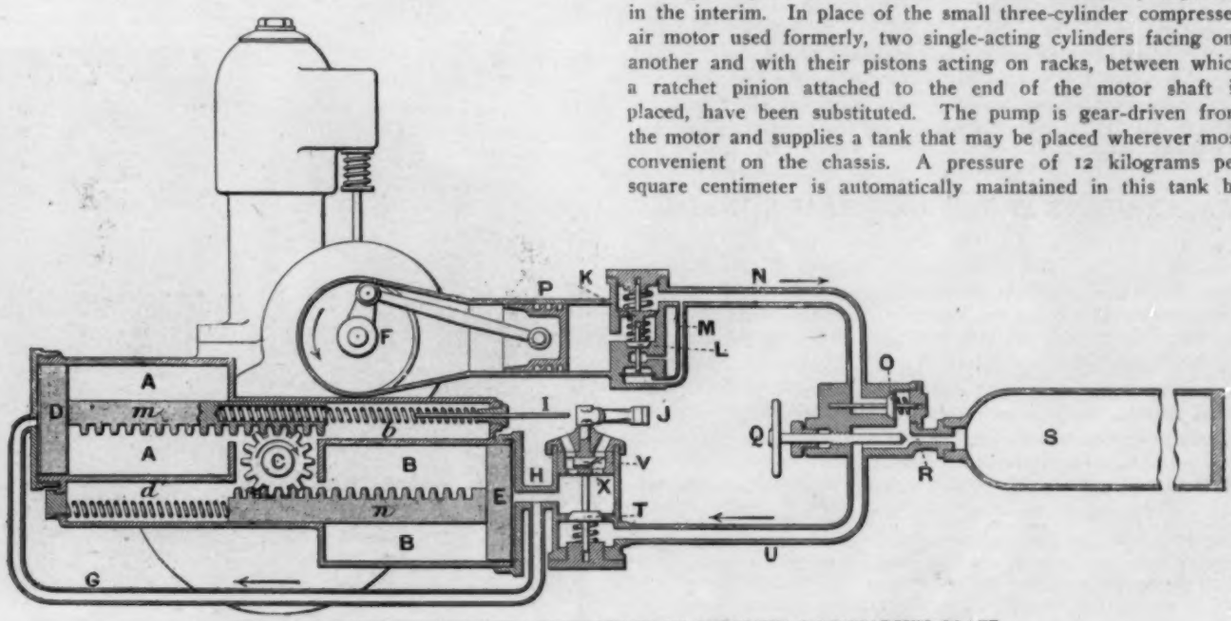
Ever since gas engines of high powers have been built, and they date back some time before the modern automobile, compressed air has been relied upon in the great majority of instances to get the engine under way. In one or two instances, such as that of the large multicylindered stationary engine built by the Wolseley Works for the General Electric Company, a cartridge containing gun powder is inserted in a breech provided for it and fired by pulling a lanyard—altogether a crude and antiquated device, as well as one totally unsuited for the purpose where frequent starting is necessary. Its use dates back a number of years; but, in the more or less infrequent instances in which it has been employed, it has had to give way to compressed air or something similar sooner or later.

For starting an automobile three classes of devices seem to lend themselves most readily to the end in view. A hand lever operated from the seat, turning the motor over by human power in much the same way as is done with the crank at present; spring devices wound by the motor, and gas or air under compression, also maintained at the required pressure by the motor, though in some instances an independent reservoir has been utilized. It is evident that of all these the use of compressed air promises most, on the score of simplicity and reliability, next to the hand lever at the seat, which is merely the crank in another place. A form of starting large engines that has not been mentioned is that of employing a smaller motor of the same type to turn over the large one, but as this must be gotten under way in the usual manner, it has no bearing on the problem whatever. Then, again, comparatively small engines of the stationary type have been on the market for years, in which self-starting is accomplished with compressed air generated by means of a hand pump, but this also is objectionable, beside which there is no necessity for resorting to hand power to generate the pressure in the case of the automobile motor. The muscular effort might better be expended directly at the crank handle.



HOW THE PUMP IS ATTACHED TO THE MOTOR.

However it may be viewed, the problem inevitably seems to point to the use of gas or air under compression, the only question of moment being whether to inject it directly into the cylinder or employ it in the form of an auxiliary motor. The latter appears to represent the simplest form, a typical instance of this being found in the device employed on the Renault cars. This concern adopted compressed air for self-starting last year, but the device has been considerably improved in the interim. In place of the small three-cylinder compressed air motor used formerly, two single-acting cylinders facing one another and with their pistons acting on racks, between which a ratchet pinion attached to the end of the motor shaft is placed, have been substituted. The pump is gear-driven from the motor and supplies a tank that may be placed wherever most convenient on the chassis. A pressure of 12 kilograms per square centimeter is automatically maintained in this tank by



SECTIONAL ELEVATION SHOWING CONNECTIONS OF COMPLETE SELF-STARTING PLANT.

means of the pump and a diaphragm valve, permitting the escape of any excess. The method of operation is as follows: The lever *F* at the end of the camshaft (Fig. 1) drives the piston *P* through a connecting rod. The air intake is at *L*, while the compressed air reaches the tank through the valves *K* and *O* and the tube *N*. A needle valve *Q* is provided on the tank, and, when closed, maintains a supply of compressed air in the latter, The tank has a cubic capacity of six liters, which, at the pressure maintained, permits of starting the car six times in succession before exhausting it. The valve *Q* is allowed to remain open, except when the car is out of use.

In order to start, a pedal on the footboard is depressed, opening the valve *T* and allowing the compressed air to flow into the cylinders, thus forcing the pistons *E* and *D* outward. The two horizontal racks act on the pinion attached to the crankshaft of the motor. Having completed their stroke the cylinders are emptied by the rack *M*, which is hollow for a portion of its length, engaging the connecting rod *I* and tripping the lever *J*, which opens the valve *X* and empties the cylinders automatically, when the operation may be repeated by depressing the pedal again.

DIAMOND RUBBER CO.'S CAR FOR PRACTICAL DEMONSTRATIONS.

A PRACTICAL TIRE TRY-OUT TRIP.

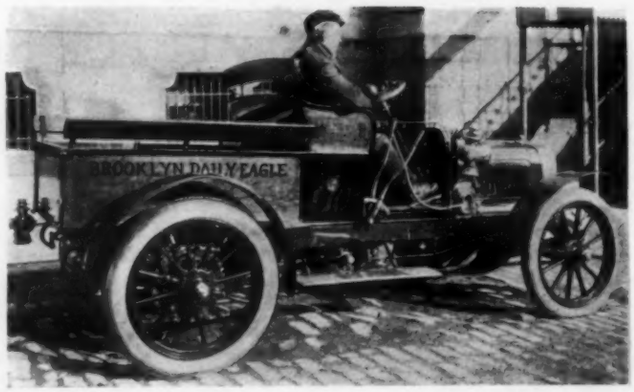
AKRON, O., Dec. 31.—As a means of presenting by practical performance the merits of the Marsh Rim and Diamond Quick Detachable Tire the Diamond Rubber Co. has put a car on the road expressly for this purpose. Notwithstanding severe weather and bad roads, the Diamond demonstrators have made rapid progress from place to place, and the health-giving qualities of automobiling, even in winter, are evidenced by the fact that the men have gained perceptibly in weight in a very short period. The record of the Marsh rims on this car has been gratifying to the Diamond company.

WASHINGTON'S PROSPEROUS YEAR'S TRADE.

WASHINGTON, D. C., Dec. 29.—Prosperity and general trade expansion have been the distinguishing features of the automobile trade in this city during the year just closing. It can be truthfully said that this statement is an accurate description of the local trade during the year. Whatever is said beyond this is merely elaboration. Everybody has been unusually prosperous and will close the year with substantial balances on the right side of the ledger. It is estimated that fully 500 automobiles of all descriptions were sold here during the year. Electrics have made great headway during the year.

The Commercial Automobile and Supply Company has removed from 715 Thirteenth street to 1313 New York avenue, a large three-story building that was remodeled for the use of the company. Wayne and Logan cars will continue to be handled.

The work of remodeling the building at 1315 New York avenue for the Motor Car Company, agents for the Peerless, Thomas and Stevens-Duryea, is progressing rapidly.



NEW DELIVERY AUTO OF THE BROOKLYN "DAILY EAGLE."

CREATING A LIGHT DELIVERY CAR.

There has been recently added to the automobile delivery force of the Brooklyn *Daily Eagle* a car which that enterprising journal recommends as a type especially suited for quick and effective work, where attractiveness in appearance is not to be lost sight of. The new creation consists of a regular Pope-Toledo chassis on which a special seat and body has been built by Flandreau. The illustration shows a very happy combination, which its users are extremely well pleased with after a practical test.

FREE REPAIRS FOR A YEAR ON 1907 CARS.

Many a would-be automobilist has undoubtedly been prevented from buying a car because of the haunting fear that the trouble and expense of keeping it in running order would be so great as to offset the pleasure derived from the use of the machine. Not very long ago there was very good reason for such fear; but the great improvements made in late years have made well-built cars exceedingly reliable. A striking indication of this fact is given in the statement made by the Quaker City Automobile Company, of Philadelphia, that 1907 cars bought from it will be kept in repair free of charge for a year, and each purchaser of a 1907 car is given a signed contract to this effect. This does not apply, of course, to damage caused by accident. The cars handled by this concern are the Pope-Toledo, Pope-Hartford, Pope-Waverley, Pope-Tribune, Franklin and Peerless, and the company's confidence in their quality is strikingly indicated by the free repair offer.

A QUAKER CITY SIGN THAT TELLS ITS OWN STORY

NEWS AND TRADE MISCELLANY.

Following the annual custom of playing Santa Claus, Harry Houpt, the New York Thomas representative, distributed among his two hundred employees and the chauffeurs who store their cars in his garage, a ton of turkeys as Christmas presents.

Owing to the great increase in its business, the Auto Brass Company, Columbus, O., makers of lamps and accessories, intends to build a plant of its own during the coming season. George Hill is the president and M. B. Lee the general manager.

Raymond S. Joo, whose Frayer-Miller car came out victorious in the recent endurance test that started off as an economy run, and who represents the Frayer-Miller interests in northern New Jersey, has just removed to a new garage at 79 Orange street, Newark.

The Cornish-Friedberg Automobile Company, representing the Aerocar and other lines in Chicago, has just moved into a specially constructed garage building at 1233 Michigan avenue. It is two stories high and is one of the most complete establishments on the row.

Charles Howard Tucker, formerly manager of the Chicago branch of the Winton Motor Carriage Company, is the designer of the new Chicago production, the Triumph car. The company building it expects to be able to have at least 100 touring cars on the road during the coming season.

The Autocar Company has just leased the premises consisting of the corner store and basement at Eightieth street and Broadway for a term of years. The building is a new one, and as soon as the necessary fittings can be installed the New York branch of the Autocar Company will occupy its new location.

The Auto Vehicle Company, of Los Angeles, Cal., will expand to a considerable extent on the completion of its three-story brick structure to be erected at the corner of Tenth and Los Angeles streets, the contract for which has just been awarded. The factory of the company is now situated at Tenth and Main streets.

The recently incorporated Star Automobile Company, of Chicago, which will manufacture light gasoline runabouts, is looking about for a favorable location for its factory. Marion, Ind., on the other hand, would welcome a further increase in its automobile manufacturers, and it is probable that this city may be selected.

George H. Earle, Jr., president of the Real Estate Trust Company, of Philadelphia, one of the Quaker City's veteran automobilists, has placed his order for a 1907 Autocar. Mr. Earle has owned every type of Autocar that has been built, and although he owns a number of foreign machines, is very loyal to the production of the Ardmore factory.

The eight cars of the new Pope-Toledo Livery Company, which has its headquarters in the Orlando F. Weber garage, at 1322 Michigan avenue, Chicago, have been kept busy ever since the company started in business about ten days ago. The officers of the company are Charles Weber, president; Alfred Reeke, secretary-treasurer, and Harry Griffin, manager. Five of the cars are of the open touring type and the other three are well fitted limousines.

The Maxwell-Briscoe Motor Company, of Tarrytown, N. Y., has purchased the entire edition of "The Making of an Automobilist" and is selling the book almost at cost, the price asked being 50 cents. The idea is that users of Maxwell or any other cars can learn a great deal about the handling and care of their machines from this practical book, and that its distribution in this way will be of benefit to the automobile movement generally.

Oakland, Cal., has purchased for the use of Chief Ball, of the fire department, a Columbia 24-28 horsepower runabout. The chief insisted on being "shown" what the car possessed in the way of staying qualities, hill-climbing ability, speed, etc., and the sale was made by the Middleton Motor Car Company, Pacific Coast representatives of the Electric Vehicle Company, who recently secured the order from the city of Oakland for a Columbia electric police patrol.

At a meeting of the directors of the recently incorporated Shoemaker Automobile Company, of Freeport, Ill., it was decided to increase the capital stock of the concern to $100,000, divided into 4,000 shares at $25 each. Although one of the objects set forth in the incorporation papers is that of manufacturing automobiles, it is expected that the company will confine itself to do a general selling and garage business. A building on Exchange street has been leased.

The Welch Motor Car Company has just awarded a contract to the Slater Construction Company for the erection of a building for manufacturing purposes in Pontiac, Mich. The new factory will measure 100 by 250 feet and will be modern in every detail. The contract calls for its completion at the end of sixty days and as soon as ready new machinery will be installed in it, tripling the capacity of the Welch company to turn out cars. Its present plant has been running night and day.

Just to show what field there is for automobiles, the American Motor Car Association has just issued some of the records of the Census of Manufacturers for 1905, which show that during that year 6,000 carriage and wagon builders in this country turned out 1,700,000 horse-drawn vehicles, valued at $97,000,000. Family and pleasure carriages numbered 940,000, valued at $57,000,000, while business and farm wagons were made to the number of 644,000, worth $37,000,000. There were 127,000 sleighs made.

James M. Mills, who represents the Cadillac interests in and about Newark, O., recently extended an invitation to every one of the owners of that make of car in that enterprising city to attend a dinner in honor of the success of the car during the past year. There are 55 Cadillac owners in Newark, and each was invited to come and bring a guest. The dinner was preceded by a theater party and followed by a recital of their experiences on the part of the guests. The affair was well attended and proved most enjoyable.

The successful Grand Central Palace show, and unusual activity of the American Motor Car Manufacturers' Association, has tended to increase the interest in its affairs which is resulting in added membership strength. A number of applications are now in the hands of the membership committee and last week two concerns were elected to the roll, which now numbers 41 manufacturers of motor cars. The two new members are the Abendroth & Root Manufacturing Company, makers of the Frontenac, and the York Motor Car Company, of York, Pa., makers of the Pullman.

Recent amendments to the constitution of the American Automobile Association have been drafted with a view to benefiting autoists who are not attached to any other organization. In accordance with the new regulations, any one now taking out an individual membership, the cost of which is still $2 per annum, will not only receive the usual benefits but his name will also be sent to the state organization where he resides. This, together with the new ruling that henceforth any one hundred members of the national body may combine to organize a state association where at present there is none, should prove an incentive that will bring about a large increase in the membership of the association.

The Knox Automobile Company, of Springfield, Mass., one of whose cars is used in that city by the fire department for carrying chemical apparatus, tools and men rapidly to fires, has arranged with the Combination Ladder Company, of Providence, R. I., large manufacturers of chemical fire extinguishers, to place on the market a stock model of this fire-fighting automobile. The machine will consist of a Model G chassis with four-cylinder 35-40-horsepower motor, carrying two 35-gallon chemical tanks, the paraphernalia usually carried by such wagons and the men necessary to properly handle the apparatus. The first model of this interesting machine will be exhibited at the Madison Square Garden show, in the commercial vehicle section.

NEW AGENCIES ESTABLISHED.

The agency for the Dragon car for Minnesota's Twin Cities and vicinity has been placed with the Auto Selling and Repair Company, of Minneapolis.

The Pacific Commercial Car Company has been organized at Seattle, Wash., with a capital stock of $25,000, and will handle the Cartercar. The incorporators are E. R. Wheeler, L. E. Younnie and Albert Armstrong, all of Tacoma, Wash. Salesrooms and garages will be maintained in both Seattle and Tacoma.

E. E. Cole, for several years connected with the Boston branch of the Winton Motor Carriage Company, has gone with the Franklin interests in that city. The latter concern expects to occupy its new quarters, at 671-673 Boylston street, about the first of the year. The new salesroom is directly opposite the Public Library.

The Autocar Company, of Ardmore, Pa., has this week closed contracts for 1907 with the following dealers: Youngs & Co., Newburgh, N. Y.; Frank P. Freeman, Rahway, N. J.; the Auto Company, Paterson, N. J.; August Stocker, Salt Lake City; the Cook Automobile Company, Portland, Ore., and the Broadway Auto Co., Seattle, Wash.

Wishing to extend their business into the Dominion, which is known to represent an excellent field for high-grade cars, the F. B. Stearns Company, Cleveland, O., makers of the Stearns cars, are desirous of getting in touch with responsible dealers in various parts of Canada, especially in such cities as Toronto and Montreal, in order to establish agencies for the coming year.

The Northwestern Cadillac Company has been formed to handle the Cadillac line in Minnesota, North and South Dakota, with headquarters in Minneapolis. They have opened a garage at 316-322 Fourth avenue, south, where a complete stock of supplies and parts will be carried and a general repair business conducted. The Waverley electric line will be handled for the city of Minneapolis. L. E. Horton is manager of the new company.

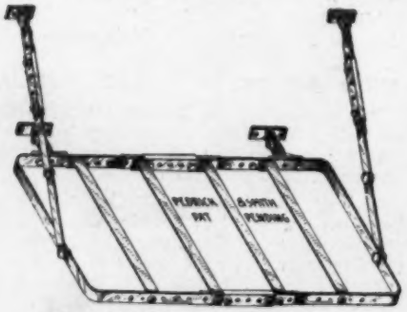
PERSONAL TRADE MENTION.

W. E. Decker, lately with the Maxwell-Briscoe Buffalo Company, has been transferred to the selling department of the Maxwell-Briscoe Co., Inc., New York.

P. A. Williams, who was manager of one of the departments of the Overman Wheel Company in the old bicycle days, and has since been connected with the automobile industry as representative of the Orient, Ford and Marion lines in Boston since 1903, later going with the Aerocar Company, has just been appointed sales agent of the runabout department of the Knox Motor Truck Company, of Springfield, Mass. The car is the Atlas, two cylinder, two-cycle runabout of 20 horsepower, which was in evidence at the recent show, together with the heavy two-cycle commercial vehicle staged by the same firm.

AN ADJUSTABLE BAGGAGE RACK.

Adjustability to every size of car, great or small, is the leading feature of the new baggage rack just placed upon the market by Pedrick & Smith, Church lane, Germantown, Philadelphia, an illustration of which is printed below. It is made of pressed steel throughout and is attached to the back of the seats by brackets. Both the



P. & S. ADJUSTABLE BAGGAGE RACK.

main framework, on which the baggage rests, and the two side supports, are adjustable as to length, this feature being the prime requisite in fitting it to the various sizes of cars. The rack, with its load, is carried well above the deck, so that this can be removed for inspecting the mechanism of the car without disturbing the baggage. When there is nothing to be carried, the rack folds up against the back of the seat and is entirely out of the way, yet ready for instant use. The rack is made in sizes suitable for all standard cars, and its length can be adjusted to suit individual requirements by means of the sliding arrangement in the main frame members. The P. & S. baggage racks are finished in black enamel and are exceedingly strong and durable.

TWO HAYES NOVELTIES.

An auto that does not drop oil on the floor of the garage is a rare thing, and to the man who has a private garage and likes to keep it clean this is a sore point. For just such service the Hayes Manufacturing Company, of Detroit, Mich., has placed on the market a floor pan of heavy galvanized iron, 30 inches wide and 94 inches long; angle iron stiffening strips are riveted to the bottom and casters are provided to make moving it about an easy matter. Besides the regular size mentioned, special sizes are made.

The same concern is turning out metal boxes for batteries and for tools. The front, back, and bottom of each box are made from a single piece and the ends are set in and double seamed. The cover has wired edges and the edges of the body are also wired. Brass hinges, locks, hasps, and staples are fitted, or else there is a brass loop on the cover through which a strap may be passed. The standard size is 8 1-2 inches wide, 10 inches high, and 16 1-2 inches long. When used for a battery box a light wood lining is put in. Two storage batteries can be carried in one box, or else one storage battery and one set of dry cells. The finish is black enamel, baked on at a high temperature. Special sizes are made to order.

GISHOLT'S AMERICAN LATHE.

In these days of high-speed methods machine tools must be made to take heavy cuts without springing or chattering, for otherwise the finished work will lack accuracy and the best speed cannot be realized in its production. The accompanying illustration shows a good example of a heavy special lathe manufactured for the Gisholt Machine Company, of Madison, Wis., by the J. Morton Poole Company, of Wilmington, Del. The lathe is of the semi-automatic turret type, and is made with and without the gap bed. The manufacturers state that it is particularly adapted to machining flywheels, and that it is used in a number of automobile manufacturing establishments.

The massive construction of the machine is at once apparent. The bed is of very deep section and the headstock is cast integral with it, the maximum stiffness being thus obtained. The spindle is of large diameter and is ground absolutely true on dead centers; it is bored with a 2 3-8-inch hole and runs in heavy bronze bearings arranged with concentric adjustment for wear so that when such adjustment is made the spindle will not be thrown out of alignment. Four ratios of double back gear are provided in the driving gearing, as well as two ratios of quadruple back gear; with the two-speed countershaft this gives no less than thirty-six spindle speeds. There are eight feed rates, varying from two to thirty-five cuts to the inch. The driving belt is four inches wide. The turret is large and heavy and affords a wide base to steady the tools in taking heavy cuts. On the standard machine, which has a swing of 24-27 inches, the turret is 35 inches in diameter across flats; the turret faces are 8 inches high. The turret has a traverse of 54 inches. The chuck is 24 inches in diameter. The swing over the turret slide is 8 inches. The American lathe is also made with 24-27-inch swing, this size having no gap. The weight of the machine is about 8,700 pounds.

RECENT INCORPORATIONS.

H. S. Houpt Company, New York; capital, $300,000. Incorporators, E. M. Houpt, F. J. Titus and A. S. Robinson.

The American Motor Company, Eau Claire; capital, $15,000. Incorporators, C. T. Bundy, Roy P. Wilcox, and Hannah F. Johnson.

Jackson Motor Car Company, Brooklyn, New York; capital, $20,000. Directors, C. M. Herring, H. W. Palmer and F. H. Palmer.

Pope-Toledo Automobile Livery, Chicago, Ill.; capital, $5,000. To deal in automobiles and supplies. Incorporators, Alfred Reeke, Harry G. Griffin and Charles Weber.

Model Machine Works, Frankfort, Ind.; to manufacture and repair automobiles; capital stock, $10,000. Incorporators, Jos. Palmer, Chalmer H. Hillis and Andrew A. Laird.

Cincinnati Motor Car Dealers' Company, Cincinnati, O.; capital, $5,000. Incorporators, Joseph T. Monfort, Charles Hanauer, Sid Black, Robert C. Crowthers and James H. Ratcliffe.

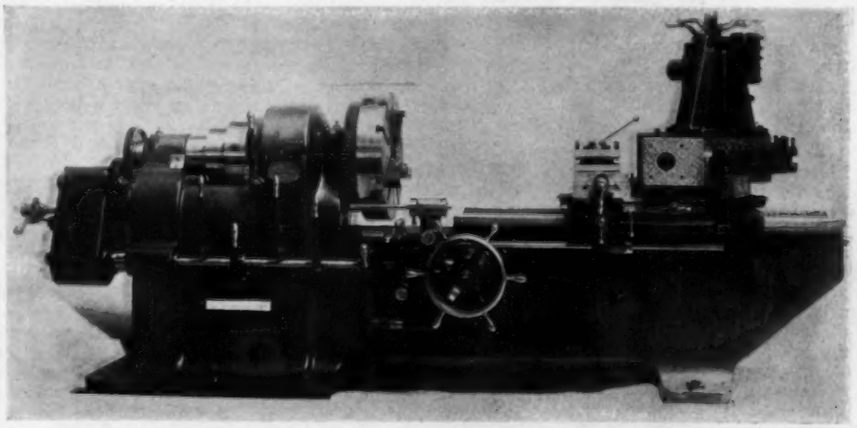
Halfield Motor Vehicle Company, Scranton, Pa.; capital, $50,000. To manufacture motor and self-propelled vehicles. Incorporators, C. B. Halfield, C. B. Halfield, Jr., Cortland; C. H. Pond, Scranton, Pa.

The Allegheny Motor Vehicle Company, Trenton, N. J.; capital, $50,000. To manufacture and deal generally in automobiles. Incorporators, E. L. Kerns, W. Harry Williams and Walter G. Reinman.

Baird-Banks Manufacturing and Supply Company, New York; to manufacture and deal in automobile and motor boat supplies; capital, $25,000. Incorporators, Milan E. Baird, George B. Banks and William James.

The Electrical Switch Plate Company, Hartford, Conn.; capital stock, $50,000. To manufacture and sell switch plate. Incorporators, John Alexander, William H. Miller, Daniel H. Judd and Francis H. Peabody, of Hartford, and Oscar E. Joss, of New Haven.

Dealers' Automobile Exchange and Development Company, Rahway, New Jersey; capital stock, $125,000. To buy, sell and deal in automobiles. Incorporators, Charles W. Nichols and Samuel D. Mershon, Rahway; and Herbert W. Walker, New York.



SEMI-AUTOMATIC TURRET LATHE, MADE BY THE GISHOLT MACHINE COMPANY.